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THESIS

**INFORMATION TECHNOLOGY CORE COMPETENCIES
OF A MARINE CORPS REGIMENT**

by

Darryl P. Korynta

June 1999

Thesis Advisor:

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CORPS REGIMENT**

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Captain, United States Marine Corps
B.S., University of Minnesota, 1991

Submitted in partial fulfillment of the
requirements for the degree of

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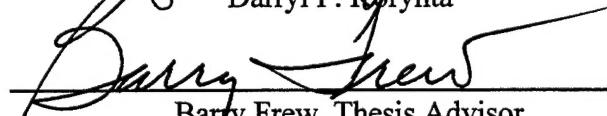
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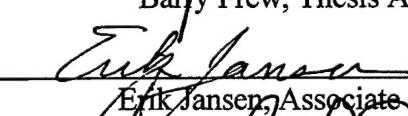
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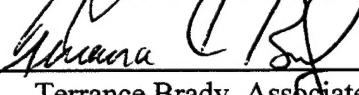
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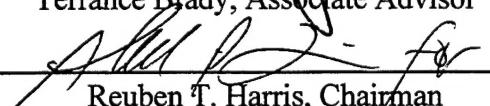

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ABSTRACT

This thesis provides a detailed description of existing and projected C4I systems within a regiment as well as the Information Technology (IT) architectures necessary to inter-connect those assets. An overview of the Individual Training Standards (ITS) and their relationship to IT services and support is addressed in addition to the shortcomings of existing ITS for the 06XX and 40XX Military Occupational Specialties (MOS). The methodology used to identify task descriptions and performance steps required to support specific C4I systems is identified as well as a proposed MOS structure for the IT related fields. The results obtained from identifying tasks and competencies of the Tactical Combat Operations system, Intelligence Analysis System, Intelligence Operations Workstation, and Tactical Data Network are applied to a competency progression model. This model is used to identify the core and core plus competencies necessary to support specific C4I systems employed at the regimental level. Applying survey instrument and interview questions, a hypothesis regarding IT competencies was tested. The survey questionnaire and interview questions focus on IT related standard operating procedures, existing IT competencies, IT related functional redundancies, commercial outsourcing of IT support, unit priorities, and IT skill requirements.

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I. INTRODUCTION

No single activity in war is more important than command and control. Command and control will not drive home a single attack against an enemy force. It will not destroy a single enemy target. It will not effect an emergency re-supply. Yet none of these essential war fighting activities, or any others, would be possible without effective command and control. Without command and control, campaigns, battles, and organized engagements are impossible, military units degenerate into mobs, and the subordination of military force to policy is replaced by random violence. In short, command and control is essential to all military operations and activities [Ref. 7].

The war-fighting missions of maneuver, intelligence, fire support, air operations, combat service support, mobility/counter-mobility and survivability all require effective command and control. Through the successful incorporation of information technology (IT) the Marine Corps has presented several software and hardware solutions that provide commanders on the battlefield with the capabilities necessary to obtain command and control.

IT has spawned the growth of several emerging Command, Control, Communications, Computers, and Intelligence (C4I) systems and networks within the Marine Corps to include the Global Command and Control System (GCCS), Unit Operations Center (UOC), Command and Control Personnel Computer (C2PC) system, Tactical Data Network/Digital Technical Control (TDN/DTC), and the Common Aviation Command and Control System (CAC2S). The growth of IT also has sparked an increase in the procurement of personal computers (PCs) and peripheral devices supporting office automation, message distribution, and electronic mail packages.

Although the procurement and addition of these information systems provide much needed capability, they also bring added difficulty with regard to the skill levels required to properly support and maintain modern C4I architectures and their systems.

The Navy and Marine Corps have introduced Copernicus and its network centric warfare concept as the integrated solution necessary to support the challenges of Command and Control in the 21st Century. The concepts established by Copernicus address several issues associated with information superiority and technological innovation as well as the requirements necessary to support C4I systems of the future. Three key enablers, co-evolution of technology, organization, and doctrine, are areas that require further study with regard to IT support. Copernicus concepts address hardware, software, and systems integration, not quite focused on the spectrum of IT skills and personnel required to support the infrastructure and specific C4I systems.

Co-evolution of technology must be applied to both IT systems and the processes used to support them. The Navy and Marine Corps address the principles of interoperability, flexibility, responsiveness, mobility, survivability and sustainability through the products selected for their C4I systems, but they stop short in addressing the evolution of its organization and doctrine required to support new and existing C4I assets. The evolution of technology needs to account for a general and complex set of IT skills. The general set of skills required by IT services and support personnel ranges from leadership, general management, teamwork, and process analysis to customer relations, requirements awareness, systems networking and telecommunications. The complex set

of skills ranges from protocols supporting Simple Network Management Protocol (SNMP) and Transport Control/Internet Protocol (TCP/IP) to supporting operating and database systems such as Windows NT, UNIX, and Oracle. IT personnel also must be capable of providing technical and administrative services including office automation, email, and collaborative planning tools. As the complexity and number of IT systems increase, so do the evolutionary requirements necessary for training support personnel within any given unit of the Marine Corps.

The objective of this research is to identify requirements necessary to support the systems of today and the emerging technologies of tomorrow. It examines existing IT skills in order to identify a specific set of core competencies that are flexible enough to meet demanding requirements of deploying units, and reinforce the concept that technology is useless without training.

A. PURPOSE

The purpose of this research is to identify the IT support requirements for a Marine Corps regiment using the Marine Air Ground Task Force (MAGTF) C4I architecture and unit staffing levels identified to support those requirements. The goal is to evaluate IT support capabilities and standards within the regiment through IT solutions aligned with Marine Corps enterprise objectives, architecture and standards defined across the enterprise, and the IT services and solutions benchmarked against Marine Corps individual training standards for all IT specific military occupational specialties.

B. RESEARCH QUESTIONS

Primary research questions include:

1. What are the existing garrison and tactical IT requirements for a Marine Corps regiment to include:
 - (a) Enterprise infrastructure (cabling, servers, switches, routers, hubs, etc.)?
 - (b) Commercial off-the-shelf equipment (desktop computers and peripherals)?
 - (c) Fielded C4I systems (Tactical Combat Operations (TCO), Intelligence Analysis System (IAS), Intelligence Operations Workstation (IOW), etc.)?
2. What are the projected garrison and tactical IT requirements for a Marine Corps regiment to include:
 - (a) Enterprise infrastructure (cabling, servers, switches, routers, hubs, etc.)?
 - (b) Commercial off-the-shelf equipment (desktop computers and peripherals)?
 - (d) Projected C4I systems (Tactical Data Network (TDN), Unit Operations Center (UOC))?
3. What are the existing IT support staffing levels for a Marine Corps regiment?
4. What are the projected IT support staffing levels for a Marine Corps regiment?
5. What are the individual training standards for IT related military occupational specialties within a Marine Corps regiment?
6. What IT standards have been established by the Marine Corps that apply to a regiment?
7. What IT support solutions have been identified by the Marine Corps that apply to a regiment?
8. What are the IT standard operating procedures used by regimental units with respect to:
 - (a) Common computer hardware?
 - (b) Common operating systems?
 - (c) Enterprise messaging software?
 - (d) Office automation?
 - (e) Network services?
 - (f) Specific MAGTF C4I systems (i.e. TCO, IAS, IOW, etc.)?

9. What are the existing competencies of IT personnel within a Marine Corps regiment with respect to:
 - (a) Common computer hardware?
 - (b) Common operating systems?
 - (c) Enterprise messaging software?
 - (d) Office automation?
 - (e) Network services?
 - (f) Specific MAGTF C4I systems (i.e. TCO, IAS, IOW etc.)?

C. METHODOLOGY

This research effort includes a literature search of books, magazine articles, and other library and Internet information resources describing IT support issues. A thorough review of the garrison and tactical IT requirements are identified by examining the regiment's enterprise infrastructure, commercial off-the-shelf (COTS) equipment, and fielded software and hardware for information systems. Individual training standards (ITS) relating to IT services and support are reviewed by applying the Instructional Systems Development (ISD) Model to specific C4I systems fielded within a regiment. These standards are further analyzed using a systems approach to training (SAT) vice the traditional Military Occupational Specialty (MOS) method applied by the Training Development System (TDS).

Data collected and used in this project was obtained via surveys, interviews and observational studies conducted with 1st, 3rd, and 6th Marine Regiments. Additional information was provided through informal collaboration among many individuals around the Marine Corps including those from United States Marine Corps Forces, Pacific and Atlantic; 1st, 2nd, and 3rd Marine Corps Divisions; Marine Corps Combat Development Command (MCCDC); Marine Corps Systems Command

(MARCORSYSCOM); and Headquarters, United States Marine Corps (HQMC). A social and interactive methodology was used to gain consensus regarding findings, trends, recommendations, and proposals. This approach greatly supported the comprehensive review of existing individual training standards, classification of duty areas, and development of a competency progression model.

D. THESIS OUTLINE

This thesis consists of six chapters. Chapter II provides the necessary background of a Marine Air Ground Task Force (MAGTF) and the role it plays within a Joint Task Force (JTF). An introduction to the regiment, the Marine Corps Combat Development System, and the Training Development System (TDS) are also discussed. Chapter III describes the existing and projected C4I systems within a Marine Corps regiment as well as the IT architectures necessary to inter-connect those assets. Chapter IV addresses the IT related skill sets necessary to support the information systems assigned to the regiment. An introduction to the Marine Corps individual training standards (ITS) and their relationship to IT support and services is provided in addition to the shortcomings of existing ITS for the 06XX and the 4XXX Military Occupational Specialties (MOS). The methodology used to identify task descriptions and performance steps required to support specific C4I systems is identified as well as a proposed MOS structure for the IT related fields. The focus for Chapter IV is on the identification of tasks and competencies necessary to support specific C4I systems (TCO, IAS, IOW, and TDN). Chapter V presents the methodology used to obtain survey and questionnaire data for this project in

addition to the findings relating to survey questions. The survey questionnaire focuses on issues associated with IT related standard operating procedures (SOP), existing IT competencies, IT related functional redundancies, and commercial outsourcing of IT support. The interview questions address the issues of unit priorities, daily operations, and IT skill requirements. Chapter VI provides a summary, conclusions, and recommendations for areas of future research.

E. EXPECTED BENEFITS OF THIS THESIS

This study provides the information required for the evaluation of proper staffing levels and training provisions necessary to support the IT requirements of regimental units within the Marine Corps. It also serves as a baseline for future study involving other units to include a Marine Expeditionary Unit (MEU), a Division, Wing or Force Service Support Group (FSSG) Headquarters, a Marine Expeditionary Force (MEF) Headquarters or the Marine Corps Component Command of a Joint Task Force.

II. BACKGROUND

A. ORGANIZATION AND MISSIONS OF THE MAGTF

1. Background

The Marine Air Ground Task Force or MAGTF is designed to provide a joint force commander with a “readily available, self-sustaining, combined arms force” capable of operations within the spectrum of conflict at all levels of war [Ref. 11]. Such operations include providing the landing force for an amphibious task force, a force capable of sustained operations ashore, or a forward presence in an area of interest. The MAGTF is a fully integrated, single-service, air-ground logistics team. Commanded by a single commander, the MAGTF provides a joint commander enhanced capabilities for independent action and interoperability with other joint and combined forces.

The Marine Corps’ concept of personnel readiness provides the foundation for the expeditionary readiness of the organization as a whole. Since the Marine Corps considers political reinforcement as the most probable commitment that Fleet Marine Forces can anticipate, the MAGTF is organized to provide measured and decisive employment of afloat-deployed Marine forces as well as their rapid reinforcement by air and sea-lifted forces [Ref. 11].

2. Organization of the MAGTF

A MAGTF is configured to accomplish certain mission requirements. Regardless of size, all MAGTF’s include four main components: a command element (CE), a ground combat element (GCE), an air combat element (ACE), and a combat service support

element (CSSE). The CE provides the command and control system that supports MAGTF operations. In situations requiring expansion of the MAGTF, the CE facilitates sequencing of additional MAGTF units. The CE consists of the commander, his staff and in some cases, surveillance, reconnaissance, and intelligence (SRIG) elements.

The GCE conducts ground combat operations. It consists of an infantry unit varying in size from a reinforced rifle battalion to three Marine divisions. The GCE contains organic combat support and combat service support units to sustain itself.

The ACE conducts air operations and provides air support to the GCE and CSSE. The ACE integrates air-ground combat operations. It consists of aviation units ranging in size from a composite helicopter squadron to three Marine aircraft wings. The ACE also contains its own combat support and combat service support units.

The CSSE provides a range of combat service support functions and capabilities that complement those of the CE, GCE and ACE. The CSSE consists of the following types of units: supply, landing support, maintenance, transportation, general engineering, health services and services. Included under the description of services are the following capabilities: disbursing, postal, exchange services, information systems, legal, security, civil affairs, and graves registration.

During amphibious operations, MAGTF's include an additional element, the Landing Force Support Party (LFSP). It is established to facilitate the flow of combat service support from ship to shore during an amphibious landing and before the CSSE is established ashore.

Although a MAGTF often is compared to a JTF, there are important differences. First, a MAGTF is designed so that its elements' primary task is to support the force as a whole, whereas a JTF's elements can be diverted to support other incidental tasks that may arise [Ref. 12]. This is a critical distinction, since, to operate optimally, the MAGTF should be assigned both an area of responsibility and a mission without being subdivided. The leverage provided by a MAGTF grows out of the concept that the MAGTF is more than just the sum of its parts. To subdivide it after it has been task-organized to meet mission requirements could jeopardize the accomplishment of the mission for which it was tailored.

The second important difference between a MAGTF and JTF is that a MAGTF is generally capable of a broad range of missions and is easily strategically deployable. A JTF is usually designed with a specific focus; beyond that focus, its capabilities are usually limited. However, both a JTF and MAGTF are task-organized and temporarily established for a specific mission. The MAGTF is usually more easily integrated into a larger naval/joint/combined force than a JTF, since the MAGTF is self-sustaining and designed for independent operations. The MAGTF's self-sustainment comes from its organic, self-contained logistics package, a characteristic that most JTF's do not have. With this capability, a MAGTF can operate pending establishment of a logistics support pipeline while a JTF can not.

3. MAGTF Command and Control

The main purpose of the MAGTF Command and Control (C2) support system is to provide a means to blend the firepower, maneuver, and C2 resources to exploit the full range of its capabilities. The C2 system further provides the means by which the commander moves and processes information to facilitate his decision and execution cycle. Maneuver C2 must provide the commander and his staff with the capability to swiftly collect, coordinate and act on near-real-time information in the support of the war-fighting mission. Maneuver C2 also must support the requirements established by JV2010 and Copernicus in an effort to maintain interoperability with the other services in the joint arena.

B. ROLE OF THE REGIMENT IN A MAGTF

The Marine Corps consists of three active divisions, located at Camp Lejeune, North Carolina; Camp Pendleton, California; and Okinawa, Japan. A division typically consists of three infantry regiments, one artillery regiment, and three independent battalions. The infantry regiment is a key organization within the Marine Corps, often used to form elements of a MAGTF as well as ad-hoc units required for special missions. The regiment is an ideal organization for the MAGTF as it is organized with three infantry battalions and a headquarters element capable of assuming specific responsibilities within the MAGTF to include the CE and the GCE. The scope of this research is limited to the study of a regiment in an effort to capture all IT support

requirements related to a specific organization that can later be applied to individual elements of a MAGTF.

C. THE COMBAT DEVELOPMENT SYSTEM

The Marine Corps' Combat Development System (CDS) concept originated in 1991 in an effort to clearly define the roles and responsibilities of Headquarters, Marine Corps (HQMC); Marine Corps Combat Development Command (MCCDC); and Marine Corps Systems Command (MARCORSYSCOM). In 1995, the Marine Corps continued its analysis by initiating a program to study the process of combat development, focusing on all sub-processes and process ownership within the CDS. The study grew into the Marine Corps Continuous Process Improvement Program (MCCPIP) which included the processes and functions that produce and sustain integrated capabilities for the Marine Corps [Ref. 13, 1-1]. The MCCPIP was designed to be used as an evaluation tool to help identify and address the relationships, actions, integration, and improvements necessary to develop concepts into desired combat capabilities. This process is still an integral part of the Marine Corps' CDS and is intended for use whenever a new concept, need, or desired capability is introduced. The MCCPIP has continued to address changes necessary within the Marine Corps to include the addition of the Chief Information Officer in 1996 and the establishment of Marine Corps Material Command (MARCORMATCOM) in 1998. A graphical representation of the MCCPIP with respect to the CDS is shown in Figure 1.

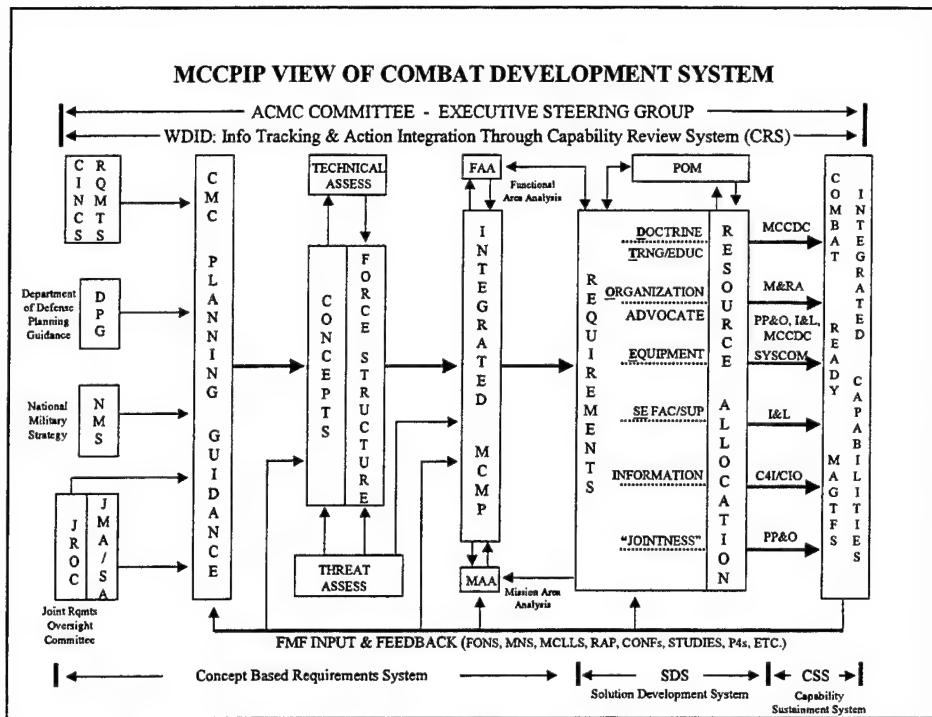


Figure 1: MCCPIP View of the CDS [Ref. 16, 1-8]

The MCCPIP view reflects how the CDS is broken down into three main phases; Concept Based Requirements System (CBRS), Solution Development System (SDS), and Capability Sustainment System (CSS). The first phase, CBRS is a crucial part of the CDS reflecting input from the Unified Combatant Commanders-in-Chief (CINC), National Military Strategy (NMS), Joint Requirements Oversight Committee (JROC) and Department of the Navy's (DON) and Commandant of the Marine Corps' (CMC) planning guidance. Technical and threat assessments are conducted, force structure examination is provided as well as detailed mission and functional area analyses (FAA) in an effort to develop an integrated Marine Corps Master Plan (MCMP). The next phase, SDS receives the capability requirements identified from the MCMP and FAA, which are then used to develop a priority list for the Program Objective Memoranda

(POM). The aim of the SDS is to identify and develop integrated capabilities, based on fundamental concepts, across doctrine, organizations, training and education, equipment, facilities and support, and information to meet the needs and requirements of the operating forces. The last phase, CSS, continues the processes established in the SDS while focusing on system fielding and life cycle management.

1. Elements of the Combat Development System

The Combat Development System (CDS) is comprised of eight processes which include: Concept Base Requirements, Resource Allocation, Total Force Structure, Human Resource Development, Material Life Cycle Management, Infrastructure Management, Information Management, and Service Advocacy. Each process is further broken down into sub-processes and supporting organizational functions. Each element of the CDS is designed to contribute to the development of integrated capabilities resulting in a finished product that will provide the necessary support for a Marine Corps MAGTF. A graphical representation of the CDS and the major process owners are shown in Figure 2.

a. *Concept Based Requirements (CBR) Process.*

The CBR process is the primary method for developing concepts and identifying operational requirements. The CBR process includes concept development, concept based experimentation, mission area analysis, formal studies, and requirements generation [Ref 13. 1-2]. The Marine Corps applies the DOTES assessment process as a vehicle for addressing relationships, actions and integration of all requirements across the

pillars of doctrine, organization, training and education, equipment, and support and facilities (DOTES).

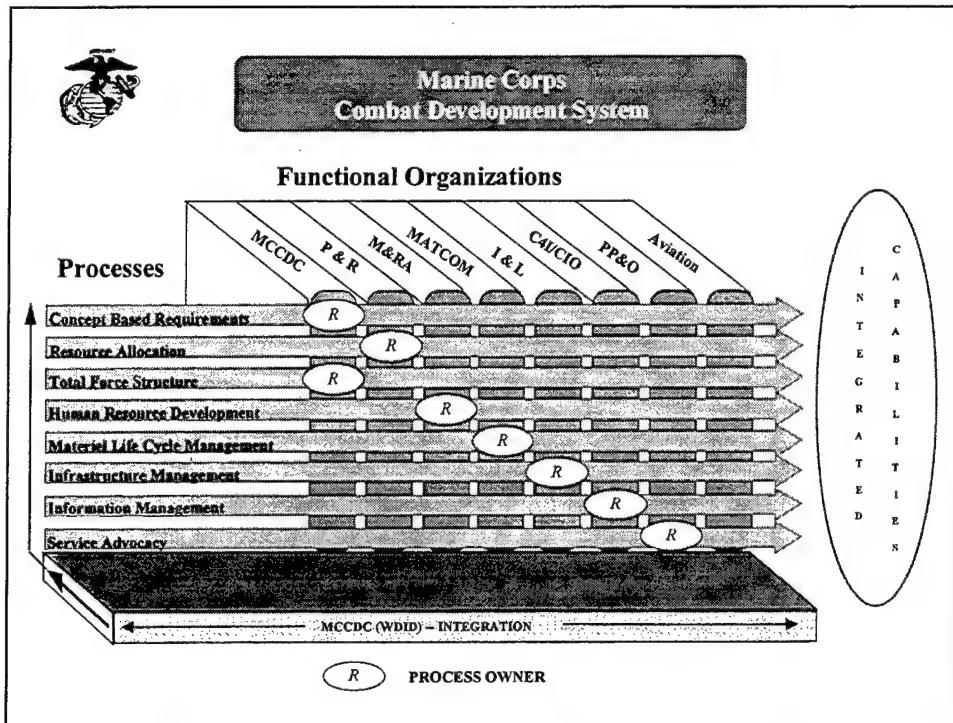


Figure 2: Marine Corps' CDS [Ref. 13, 1-1]

As the process owner for the CBR process, the Commanding General (CG) MCCDC is responsible for concept development and experimentation, strategic planning, and identification of requirements necessary to implement future operational capabilities outlined in the MCMP. CG MCCDC receives input and coordinates with the Operating Forces and Supporting Establishments through the Fleet Operations Needs Statements (FONS), Mission Needs Statements (MNS), Marine Corps Lessons Learned System (MCCLS), conferences, studies and personal for (P4) naval messages in an effort to incorporate their needs and perspectives into the CDS. Once the

Requirements Determination sub-process is initiated, the DOTES assessment process begins. Plans, Policies, and Operations (PP&O), HQMC and Doctrine Division, MCCDC assess existing doctrine in order to determine whether the future capability need requires a change in current Tactics, Techniques, and Procedural (TTP) documentation. This process is a crucial step when developing information systems designed to support the command and control of operating forces. If a material solution is developed to support a stated operational requirement without the appropriate TTPs, the operating forces will spend needless amounts of energy trying to determine the best method of employment and support for the new system.

b. Resource Allocation (RA) Process.

The RA process is used to produce the annual budget for the Marine Corps. This involves providing Marine Corps' input to the DON POM, formulating and defending budget requests, and overseeing budget execution. Finally, the RA process represents the Marine Corps within the DON and Office of the Secretary of Defense (OSD) Planning, Programming, and Budgeting System (PPBS) decision forums, including both the program and budget review processes [Ref. 13, 1-2]. The process owner for RA is the Deputy Chief of Staff, Plans and Resources (DC/S P&R).

c. Total Force Structure (TFS) Process.

The TFS process uses the input from the CBR and RA processes to determine how the Marine Corps Total Force will be structured. The TFS process documents the structure through Mission Statements, Tables of Organization and

Equipment (T/O&E), the Troop List, and the Authorized Strength Report (ASR) [Ref. 13, 1-3]. The major sub-processes and products include the developing of organizational missions and structures, and the allocation of manpower and equipment resources. The TFS process addresses all organizational requirements when a current capability deficiency or a future capability need requires a change. Although the Human Resource Development (HRD) Process, Material Life Cycle Management (MLCM) Process, and various functional leaders generate input for the TFS process, it receives most organizational requirements input from the CBR process. Therefore, when a MNS or ORD is submitted by the operating forces identifying the requirement for a new capability without the need for a change in the organization structure, the effort required by TFS process is greatly reduced.

The process owner for TFS is CG MCCDC. Appropriate organizational structure is developed through consultation with other process owners, functional leaders, Occupational Field (OccFld) Managers, Military Occupational Specialty (MOS) Specialists, billet coordinators, and subject mater experts [Ref. 13, 2-8].

d. Human Resource Development (HRD) Process.

The HRD process responds to the Authorized Strength Report produced by the TFS process and training requirements identified by the CBR process to appropriately staff Marine Corps organizations with the right mix of personnel, while assisting with their personal needs [Ref. 13, 1-3]. There are seven sub-processes that comprise HRD: develop plans, access, classify, train and educate, assign, promote, and

attribute. Although all seven sub-processes are critical for the success of the HRD process, special attention is applied toward training and education. The training and education sub-process identifies each MOS training and education requirements necessary to produce qualified Marines capable of filling structure vacancies. Details of the training and education sub-process are addressed in greater detail throughout Chapter IV of this document. The process owner for HRD is DC/S Manpower and Reserve Affairs (M&RA), HQMC.

e. Material Life Cycle Management (MLCM) Process.

The MLCM process develops equipment solutions in response to MNSs and ORDs developed in the CBR process and to Acquisition Objectives developed in the TFS process [Ref. 13, 1-3]. The major sub-processes and products include: acquire assets, field combat equipment, maintain supply and combat equipment readiness, and phase out obsolete items from the inventory. The MLCM process interfaces with the RA process for budgetary purposes as well as equipment allowances from the TFS process. Additionally, the MLCM process provides input to the HRD and Infrastructure Management processes concerning manpower, support and facilities. The process owner for MLCM is the Commander Marine Corps Material Command (COMMARCOMFORMATCOM).

f. Infrastructure Management Process.

The Infrastructure Management process responds to support and facility requirements identified through the CBR process as well as maintains awareness of

developments in all CDS processes [Ref. 13, 1-3]. The major sub-processes and products include: oversee infrastructure planning and design, monitor infrastructure construction, acquire/divest infrastructure, and maintain and protect infrastructure. The process owner for Infrastructure Management is DC/S Installations and Logistics (I&L), HQMC.

g. Information Management Process.

The Information Management process supports all other processes within the CDS by creating and sustaining information management capabilities necessary to enhance decision making and execute integrated actions at all levels throughout the Marine Corps [Ref. 13, 1-3]. There are three sub-processes including: develop Information Technology (IT)/Information Management (IM) plans, create IT/IM capabilities, and sustain IT/IM capabilities. The process owner for Information Management is DC/S C4I, HQMC.

h. Service Advocacy (SA) Process.

The SA process maintains awareness of the status of developments in all CDS processes and is the primary Marine Corps representative to outside agencies. It uses this information to market Marine Corps capabilities to the Joint Staff, DOD, the Unified Combatant CINCs, OSD, Congress, and the public [Ref. 13, 1-4]. The major sub-processes and products include: research, analysis, and feedback; prepare the battlefield; create public support; and participate in Joint Strategic planning. The process owner for SA is PP&O, HQMC.

CG MCCDC has the responsibility for integration of capability development actions within the CDS. Integration involves monitoring, coordinating, and influencing the identification, development, and fielding of the right combinations of resources which cross process, function, mission areas, and the DOTES domain interests. Integration includes the harmonization of Marine Corps capabilities with those of other services and allies. Warfighting Development Integration Division (WDID) is the CG MCCDC's primary agent for ensuring integration across the CDS [Ref. 13, 1-5].

The first three processes – CBR, RA, and TFS – collectively set the course for capability development in the Marine Corps. Their outputs drive development of products in the HRD process, the MLCM process, the Infrastructure Management process, and the Information Management process; as well as changes to Marine Corps doctrine and Marine Corps input to Joint doctrine [Ref. 13, 1-4].

2. Summary

The Marine Corps uses the CDS as a vehicle to identify, develop, and field integrated capabilities based on service programs, initiatives, structure, doctrine, organization, training, and education. While it is a good tool for identifying and addressing those items needed to convert concepts into actual combat capabilities, it lacks a systematic process to properly validate stated requirements. This process needs to be enforced as well as augmented to include the review of existing support capabilities relative to projected system requirements and the expansion of training assessments and organizational support structure for the evolution of C4I systems.

D. TRAINING AND EDUCATION WITHIN THE MARINE CORPS

In 1998, Training and Education (T&E) Division, MCCDC, initiated a prototype effort to modernize Marine Corps skills training. Focused on the Military Occupational Specialties (MOS), T&E Division developed a methodology designed to identify the required skills necessary within each area and classified them in terms of core and core plus competencies. As a result, the Training Modernization Initiative (TMI) was conceived, aimed at identifying improvements necessary within the processes of training Marines. The recommendations included the development of new Individual Training Standards (ITS) for specific MOS's; establishing a formal staffing process for training development; the use of standard languages within training development; and better indoctrination of the Systems Approach to Training (SAT) process.

In March 1999, the elements of TMI and the existing SAT process were merged resulting in the creation of the Training Development System (TDS). Incorporating input from the Operating Forces and Supporting Establishments, T&E Division applies TDS, Distance Learning (DL), formal resident training, and performance support tools to achieve the most effective and efficient way of teaching Marines the skills required within their MOS. The TDS is designed to support T&E's involvement within MCCDC's Combat Development System (CDS), providing inputs for the Total Force Structure (TFS) and Human Resource Development (HRD) sub-processes.

1. Training Development System (TDS)

The training required by any Marine is an ongoing process that begins when they enter the Marine Corps and continues throughout their career. Since 67% of the Marine Corps consists of individuals in their first enlistment, the primary focus of the TDS is on entry level training [Ref. 19, 8]. The essential tasks of the TDS are to ensure that first-term Marines rapidly learn the skills they will need upon arrival to the operational units and the continued training throughout their career, focused on the requirements necessary to support identified skills for each MOS. The TDS is comprised of six sub-processes and subgroups: the Training Review Group (TRG); Subject Matter Expert (SME) conference; Integrated Curriculum Design Board (ICDB); Product Development; Implementation; and Evaluation. A graphical representation of the TDS is shown in Figure 3.

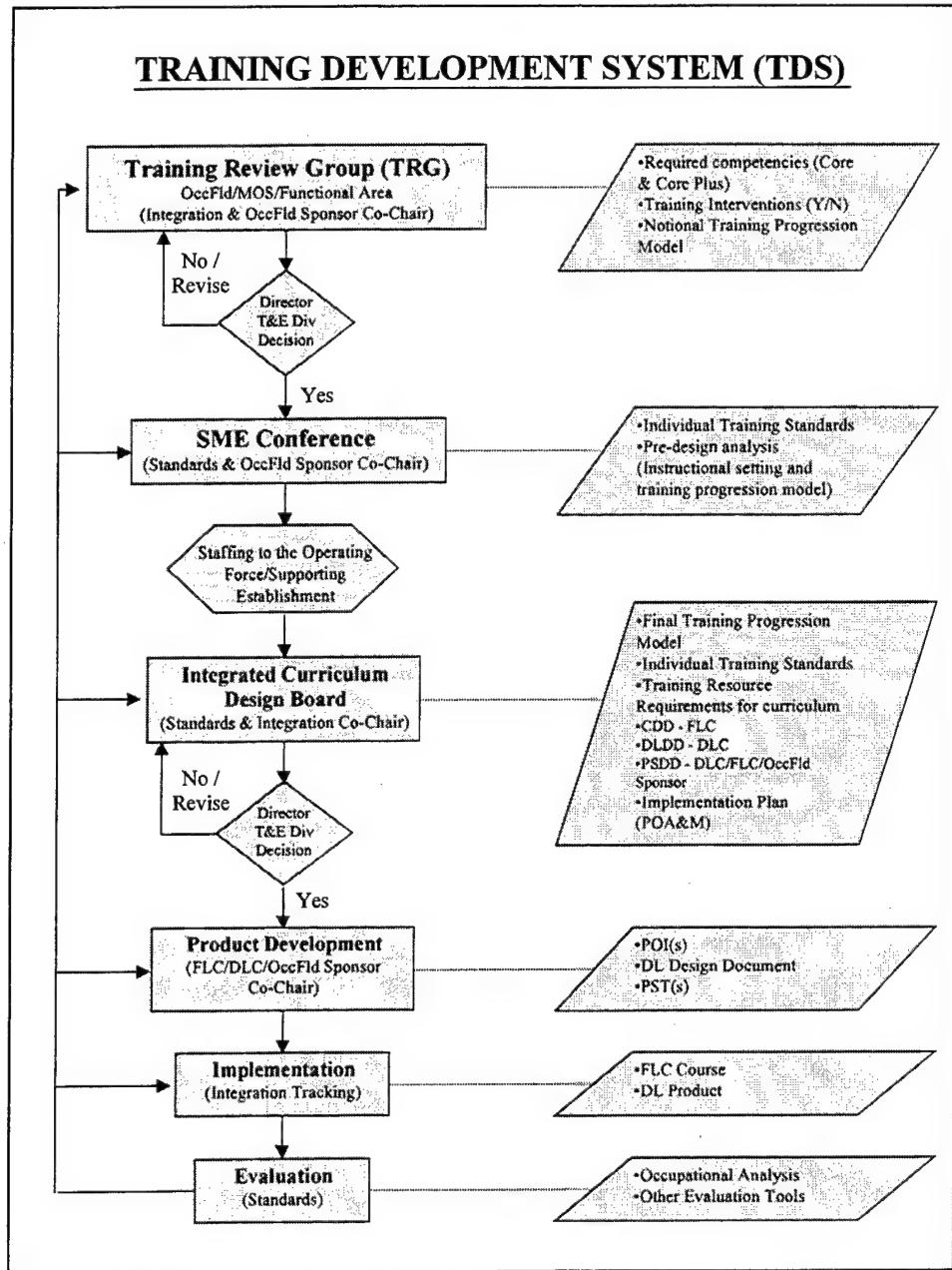


Figure 3: Training Development System [Ref. 19, 21]

a. Training Review Group (TRG).

The TDS begins and ends with the evaluation of standards as they apply to a specific MOS. For the purpose of this research, the occupational specialties considered include the 0602, 2542, 2818, 4066, and 4068 MOSSs. The evaluation process is

conducted by the Training Review Group (TRG), responsible for identifying the MOS mission outputs and skills (core and core plus) required by each functional area under review. The TRG reviews changes in doctrine; organizational and occupational structure; equipment and facilities; recruitment; tactics, techniques, and procedures (TTPs); and several issues relating to training improvements using technology based support tools.

The TRG is comprised of senior leadership from the Operating Forces and Supporting Establishments; the Military Occupational Field (OccFld) sponsors; representatives from T&E Division; MARCORSYSCOM; Manpower & Reserve Affairs (M&RA); Requirements Division and Total Force Structure. The TRG, co-chaired by the OccFld sponsor and T&E Division's Integration Branch, accomplishes the task of identifying core and core plus skills by following six steps: (1) verifying MOS mission outputs, (2) identifying skills for the MOS mission outputs, (3) classifying skills by type (core and core plus), (4) listing resource considerations, (5) developing MOS career progression charts, and (6) developing Commander's intent for the SME conference. The output produced by the TRG is forwarded to the Director of T&E Division for guidance and approval prior to the establishment of a Subject Matter Expert (SME) conference.

b. Subject Matter Expert (SME) Conference.

The primary requirement of the SME conference is to identify the essential tasks for each MOS or functional area's core and core plus skills established by the TRG. These tasks are then mapped to the training progression model that identifies the typical

path followed by a Marine in a specific MOS. Additionally, the SME conference identifies the instructional settings that can best provide the training required as well as improvements in training including distance learning and the use of Functional Learning Centers (FLC) and Performance Support Tools (PST). The MOS specific Individual Training Standards (ITS) are the final output produced by the SME conference, which is subsequently forwarded to the Operating Forces and Supporting Establishments for review.

The membership of the SME conference typically includes the same organizations involved in the TRG. The participants include those members capable of providing the service-level training perspectives and detailed knowledge of the tactics, techniques, and procedures involved in supporting the mission output for a specific MOS. The detailed components of the SME conference output includes: (1) MOS mission output statements; (2) core and core plus skills with associated tasks, conditions, standards, performance steps, applicable grade requirements, sustainment factors, references, and administrative instructions; and (3) the career training progression curriculum model.

c. Integrated Curriculum Design Board (ICDB).

The ICDB is responsible for developing the curriculum strategy for the occupational specialty under review. This plan includes a final training progression model, the ITS order, curriculum resource requirements document, and an

implementation plan of actions and milestones. These documents are provided to the Director, T&E Division for approval prior to the final product development phase.

The ICDB, co-chaired by Standards and Integration, considers each component of the curriculum plan for their interactions and determines the most efficient and effective curriculum for the MOS. The ICDB is allowed sixty days to complete its analysis and submit its curriculum recommendations to the Director, T&E Division.

d. Product Development.

Once the curriculum has been approved, the task of development begins. The Functional Learning Center (FLC) for the MOS under review and the Distance Learning Center (DLC) will begin developing detailed Period of Instructions (POI's), design documents, and the performance support tools required by the curriculum. During the product development phase, all efforts are focused on producing a training package designed to support the approved curriculum plan. Any recommendations to deviate from the approved curriculum plan must be submitted to the Director, T&E Division for approval.

e. Implementation.

Although the actual training is performed in the schoolhouse or through the Distance Learning Center, the Standards Branch, T&E Division, manages implementation of the developed curriculum plan.

f. Evaluation.

Evaluation is the final phase of the TDS, an ongoing process managed by the Standards Branch, T&E Division. This process is accomplished by several methods including the use of surveys and detailed analysis of the entire MOS and the curriculum plans used to support its training requirements.

2. Summary

Evolution of technology must be applied to both the IT systems and the processes used to identify and support them. The Marine Corps addresses the principles of interoperability, flexibility, responsiveness, mobility, survivability and sustainability through the products selected for their C4I systems, yet stops short in addressing the evolution of its organization and doctrine (TTPs) required to support new and existing C4I assets. This is an important concept that should be considered when reviewing the architecture supporting regimental C4I systems.

III. THE C4I ARCHITECTURE

Joint Vision 2010 (JV2010) defines four key operational concepts: dominant maneuver, precision engagement, full dimension protection, and focused logistics. JV2010 further describes education and training as one of the six critical elements required to transition the four operational concepts into joint capabilities necessary to achieve full spectrum dominance and interoperability among the services. One of the essential core strengths of these operational concepts is the requirement for highly qualified, well-trained, people.

The Navy and the Marine Corps have introduced Copernicus and its network centric warfare concept as the integrated solution necessary to support the challenges of JV2010. The concepts established by Copernicus address several issues associated with information superiority and technological innovation as well as discussing the requirements necessary to support C4I systems of the future. The Copernicus concepts address hardware, software, and systems integration, focused on the issues outlined in the Defense Information Infrastructure Common Operating Environment (DII COE) designed to meet the requirements of interoperability among all C4I systems.

A. DII COE

The DII COE is an approach for building interoperable systems, a reference implementation containing a collection of reusable software components, a software infrastructure for supporting functional area applications, and a set of guidelines, standards, and specifications [Ref. 25, 1-1]. The Office of the Secretary of Defense

issued a directive, 30 August 1996, which mandates that all-new military systems, excepting weapons control systems, shall use the DII COE.

The Global Command and Control System (GCCS) provides functionality such as situational awareness, readiness assessment, course of action development, imagery exploitation, crisis planning, deliberate planning, operation plan generation, deployment of forces, indications and warning, and near real time combat execution from a C4I perspective. Just as Microsoft Windows provides a graphical user interface to its operating system that allows windowing applications to be developed without having to recreate the environment, GCCS provides a modular building block concept to C4I while implementing functional area applications and guidelines established by the DII COE. The Marine Corps' version of this process is called the MAGTF Software Baseline (MSBL).

B. SOFTWARE APPROACH

The MSBL is a configuration management approach used to field C4I software utilizing chosen application segments such as security services and system administration built upon the DII COE. Initially these segments have been built to use the Joint Maritime Communication Information System (JMCIS) operating environment, but will ultimately migrate to the GCCS as it becomes fully operational. This approach has been applied to several systems including the Tactical Combat Operations (TCO) system, Intelligence Analysis System (IAS), and the Intelligence Operations Workstation (IOW).

C. HARDWARE APPROACH

The Marine Corps recently established an IT strategy for connecting technologies necessary to support current and future C4I systems. Over the past couple of years, the Marine Corps has adopted several key concepts that have enabled it to stay on track with hardware, software and the integration of C4I systems necessary to meet the requirements established by the DII COE. Understanding the need for revolutionary changes in IT requirements definition and acquisition management processes, the Marine Corps Common Hardware Suite (MCHS) was established as the answer for providing a link between the customer, program manager and hardware requirements for C4I systems. Additionally, the establishment of eight new ORDs has allowed the Marine Corps to make great strides forward with regard to the integration provisions of its systems. Four of the ORDs define operational requirements that support the information infrastructure while the other four define operational requirements that support all four elements of the MAGTF.

Combining the MAGTF C4I ORDs with the MCHS, the Marine Corps provides the standardized computing environment, standards-based systems management, service and support improvements and effective asset management practices mandated by JV2010, DII COE and Copernicus. Taking advantage of evolutionary capabilities provided by technology and implementing them into the operational MAGTF's C4I systems have allowed the Marine Corps to continue to meet increasing demands of command and control as well as the MAGTF C4I architecture.

D. REGIMENTAL C4I ARCHITECTURE

The C4I architecture for a regiment has typically been divided into two separate and distinct areas: tactical and garrison. Tactical refers to all assets designed to support the regiment in both combat and training environments while garrison refers to those assets that typically remain on the base or camp when a unit deploys. Both architectures are designed to provide capabilities necessary to support the regiment's command and control requirements while remaining completely interoperable and independent from each other. As time passed, these two architectures began to merge in both functional capability and logical design. For example: the requirement for commercial telephone connectivity was supported by integrating the tactical switched telephone network with the garrison infrastructure's telephone system. As office automation capabilities improved so did the requirement to extend personnel computers and peripheral devices into the tactical arena. Within a rather short period of time the differences between the two C4I architectures supporting a regiment have become much more similar than different.

In order to better understand the regimental C4I architecture, it is important to first consider the major systems employed as well as their command and control functionality within the organization.

1. C4I Systems

Considering the range of capabilities and assets within a MAGTF, C4I systems must be integrated and designed to share information both internal and external to the

organization. This information is then used to provide a common picture of the battlefield that can be shared by all involved. The information flowing to the commander needs to be processed, fused, and tailored to assist him in making decisions. Any decision support system (DSS) used by a MAGTF must also integrate information from the functional areas of command and control, fires, intelligence, logistics, maneuver, and force protection. The integration of these functional areas contributes directly toward achieving unity of effort and tempo, thus enabling the decisive application of combat power. A graphical representation of functional mission areas is provided in Figure 4.

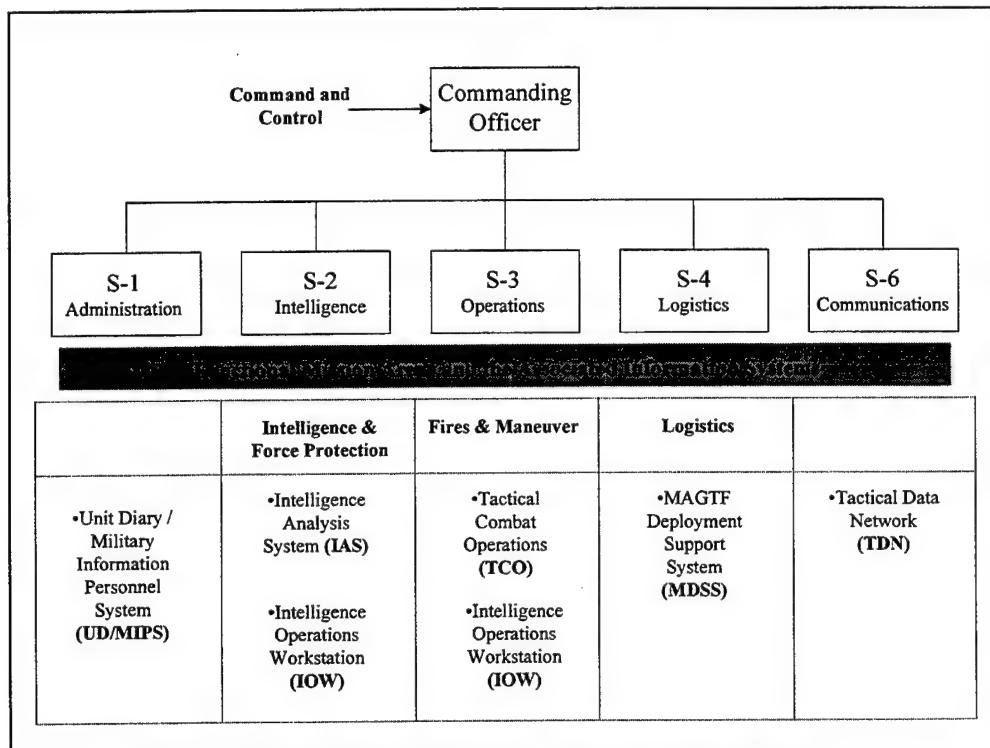


Figure 4: Functional Mission Areas of a MAGTF

MAGTF C4I is an umbrella term that defines a prescribed set of systems presently fielded to the operating forces or those still in development. Although a regiment

employs several C4I systems, the focus of this research is on four specific platforms and one command post configuration: Tactical Combat Operations (TCO), Intelligence Analysis System (IAS), Intelligence Operations Workstation (IOW), Tactical Data Network (TDN), and Unit Operations Center (UOC).

a. Tactical Combat Operations.

Tactical Combat Operations (TCO) is the maneuver component of the MAGTF's command information system. This system is designed around the Hewlett Packard (HP) UNIX computer with the capability of displaying maps and unit locations as well as creating and disseminating overlays and movement plans. Maneuver warfare demands that any C2 support system be capable of creating a common situational awareness throughout the battlefield. This is achieved by rapidly storing and distributing information among the commander, his staff, key decision-makers, and supporting forces. TCO is designed to quickly and accurately move tactical information on the battlefield, allowing a commander to readily access information and display current situational reports necessary to assess strength and movement. TCO provides the war fighter's most visible link via a "Common Tactical Picture" (CTP) spanning the spectrum from sensor to shooter, thus enhancing understanding of the battle space.

TCO is employed from the MEF to the battalion levels. It is intended to be connected via a MAGTF-wide information exchange grid including the use of single and multi-channel radio systems, Enhanced Position, Location, Reporting System (EPLRS) and the TDN. Although it is designed to provide automated decision support

for commanders in garrison and tactical operations, it is rarely used for other than tactical purposes due to security requirements and connectivity issues within garrison facilities.

b. Intelligence Analysis System.

The evolving MAGTF C4I concept has an intelligence support function based on the utilization of a Marine variant of JMCIS, which supplies the necessary intelligence automation support and connectivity to the supporting intelligence organizations from the national level down through operational theater Joint Intelligence Centers and service organizations. Intelligence Analysis System (IAS) consists of the Naval Tactical Command System-Afloat (NCTS-A) Intelligence Processing Service (NIPS) and other related segments, which are collectively a part of intelligence C2. IAS serves as the MAGTF's all-source intelligence fusion center, allowing analysts to rapidly process information from a wide range of national, theater, and tactical intelligence sources.

The regimental IAS suite consists of two HP UNIX based computers with associated ancillary equipment designed to operate at the secret and Top Secret/Special Compartmented Information (TS/SCI) levels. The computers are configured to perform as one IAS Joint Operational Tactical System (JOTS) 1 function supporting the Track Database Management System (TDBMS) and one IAS JOTS 19 function of the JMCIS architecture. Other functions include a computer database server, communications server, communications interface devices as well as computer workstations (JOTS 2 and JOTS 14 functions).

c. Intelligence Operations Workstation.

The combination of functionality from the TCO and IAS programs has resulted in the development and fielding of the Intelligence Operations Workstation (IOW). The regimental IOW suite consists of three International Business Machine (IBM) 770 laptop computers with associated peripheral devices. Supporting the Windows New Technology (NT) operating system, these platforms provide the same level of capability as the UNIX systems short of track database management and communications services via the C2PC software package. Figure 5 shows the notional links connecting TCO, IAS, and IOW for infantry units within a division.

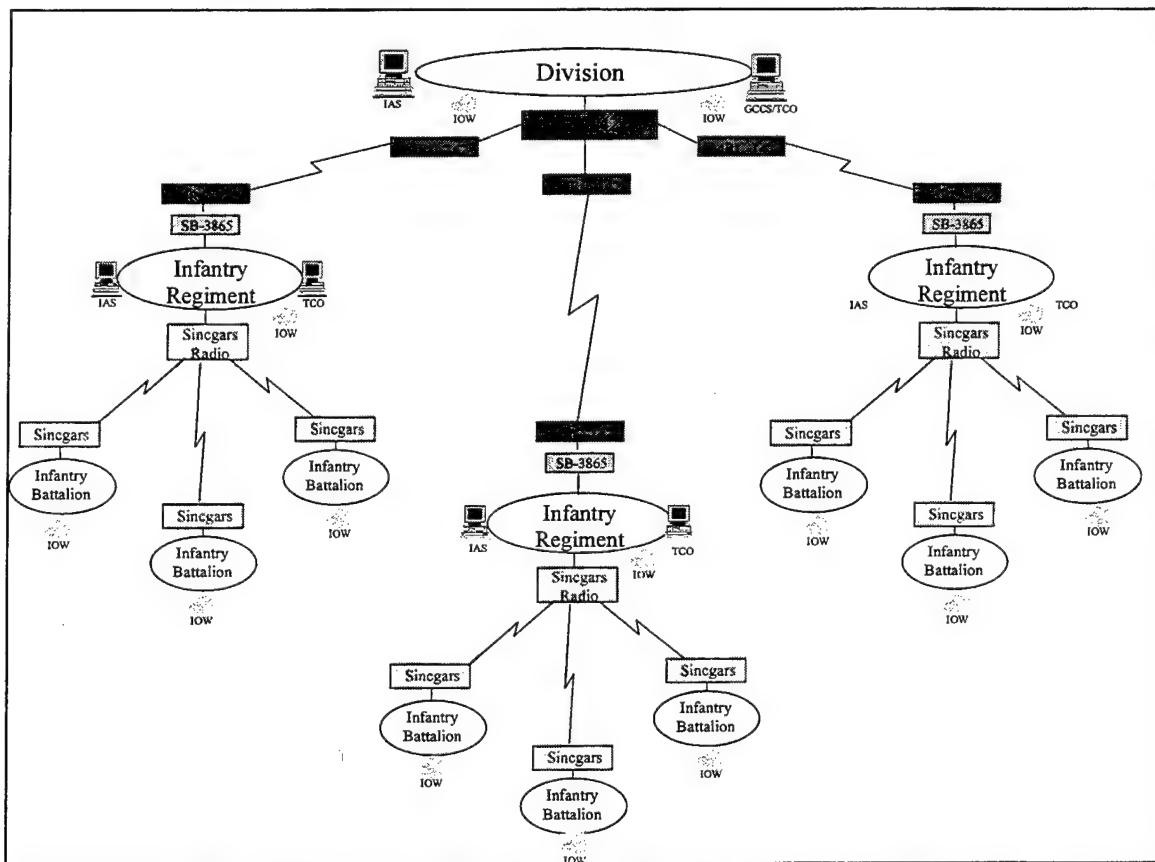


Figure 5: Notional links connecting TCO, IAS, and IOW

The communication links connecting the division and regiments include the use of a Unit Level Circuit Switch (ULCS) digital switched backbone system provided by the AN/TCC-42 and SB-3865 devices. The transmission path is provided by the Army Navy / Mobile Radio Communications (AN/MRC-142) digital ultra-high frequency (UHF) multi-channel radio. This system provides a communications path capable of 32 kilobits per second (KBPS) with a maximum range of approximately 30 kilometers (line of site). The links connecting the regiment to battalions are accomplished via single-channel very-high frequency (VHF) SINCGARS radios using an interface provided with the TCO system. Although the SINCGARS communications system is capable of transmitting data at 16 KBPS, this radio is restricted to approximately 10 kilometers on high power. Greater ranges can be achieved with the single-channel radio system, however, it will occur at the expense of data throughput.

A significant problem associated with the connectivity between a regiment and a battalion is related to the Year 2000 (Y2K) date issue. A recent upgrade necessary to prevent the Y2K problem for the TCO UNIX operating system (HP 10.20) resulted in failure of the interface device which is necessary to link TCO with SINCGARS radios. Thus, tactical data communications below the regiment is no longer possible until an appropriate interface is procured and subsequently fielded to the operating forces.

d. Tactical Data Network.

The Tactical Data Network (TDN) is designed to augment the existing MAGTF architecture by providing an integrated data communications network for the

tactical data systems. It consists of gateways and servers interconnected with one another via a combination of single and multi-channel radio systems, local area networks, and switched telephone systems. The TDN system is designed to provide a network distribution system capable of interconnecting all data communication systems organic to the regiment. This system is scheduled to include a server, network cabling, switching and appropriate software necessary to provide centralized support for message handling, network management, file backup and recovery, and resource sharing. Fielding of the TDN is scheduled for Fiscal Year (FY) 2000 designed to provide a logical architecture as displayed in Figure 6.

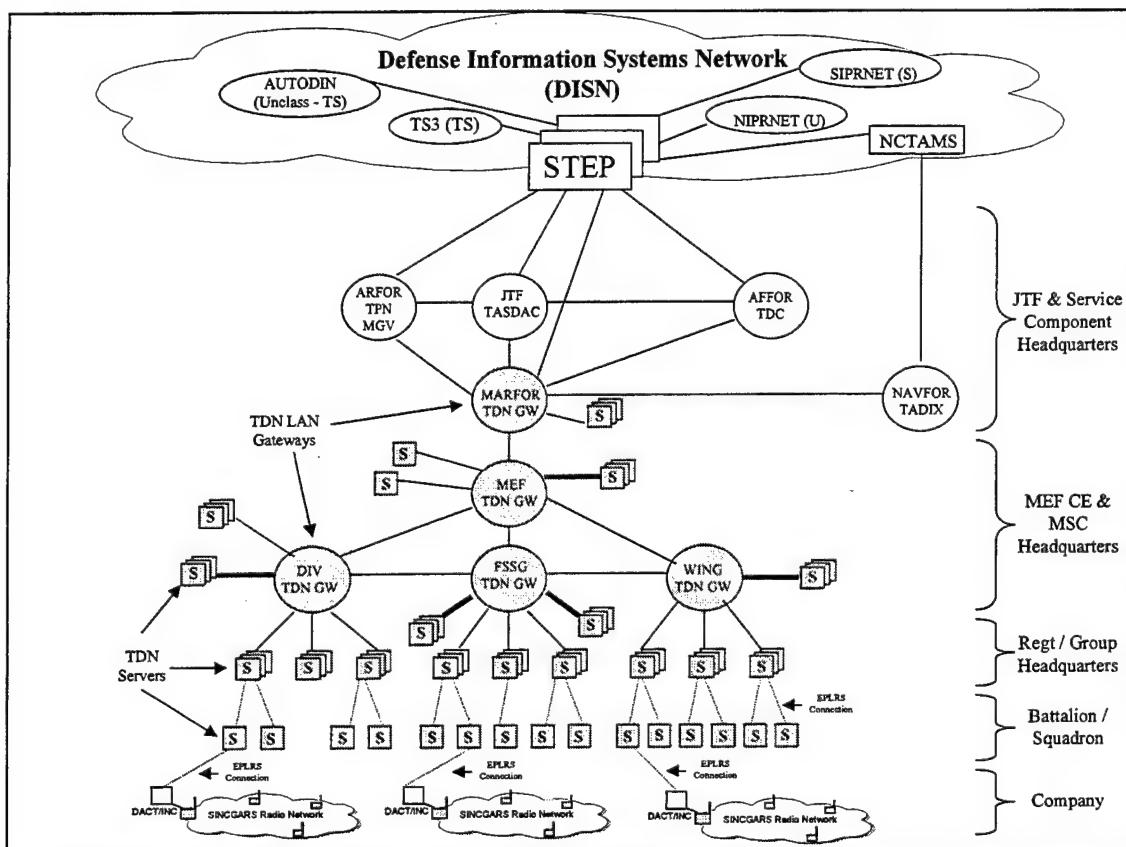


Figure 6: TDN Logical Architecture [Ref. 18]

e. Unit Operations Center.

The Unit Operations Center (UOC) is a subset of the Expeditionary Integrated Combat Operations Center (EICOC) development effort. This project focuses on five design areas related to combat operations including: (1) addressing the issues of cognitive task analysis. (2) Providing an enhanced ergonomic physical design. (3) Conducting an evaluation of advanced multimedia hardware. (4) Performing the integration and networking of advanced developmental communication systems. (5) Analyzing advanced software development solutions capable of supporting systems integration and advanced battlefield visualization concepts. Although the UOC consists of a garrison Command Center (CC) and a tactical Combat Operations Center (COC), the focus of this study is placed on COC aspects since most regimental headquarters do not maintain a CC. The most crucial aspect of this program is its attempt to incorporate other C4I programs, accounting for the integration of systems, power requirements, and miscellaneous peripheral devices necessary to provide the support required by tactical command posts.

The UOC program focuses on specific performance parameters to include:

- (1) The UOC prototype will be built around the battalion command post yet remain flexible and scaleable enough to support larger command structures.
- (2) Tactics, techniques, and procedural development that specify staff members, systems, and functionality issues within the UOC.
- (3) Establish procedures for communications setup, communications on the move, and communication channels required to support voice,

video and data requirements within the command post. (4) Power and grounding requirements to include generators, un-interuptable power supply (UPS), and power distribution systems. A draft conceptual view of the magnitude and complexity involved in this program is reflected by the regimental COC configuration shown in Figure 7.

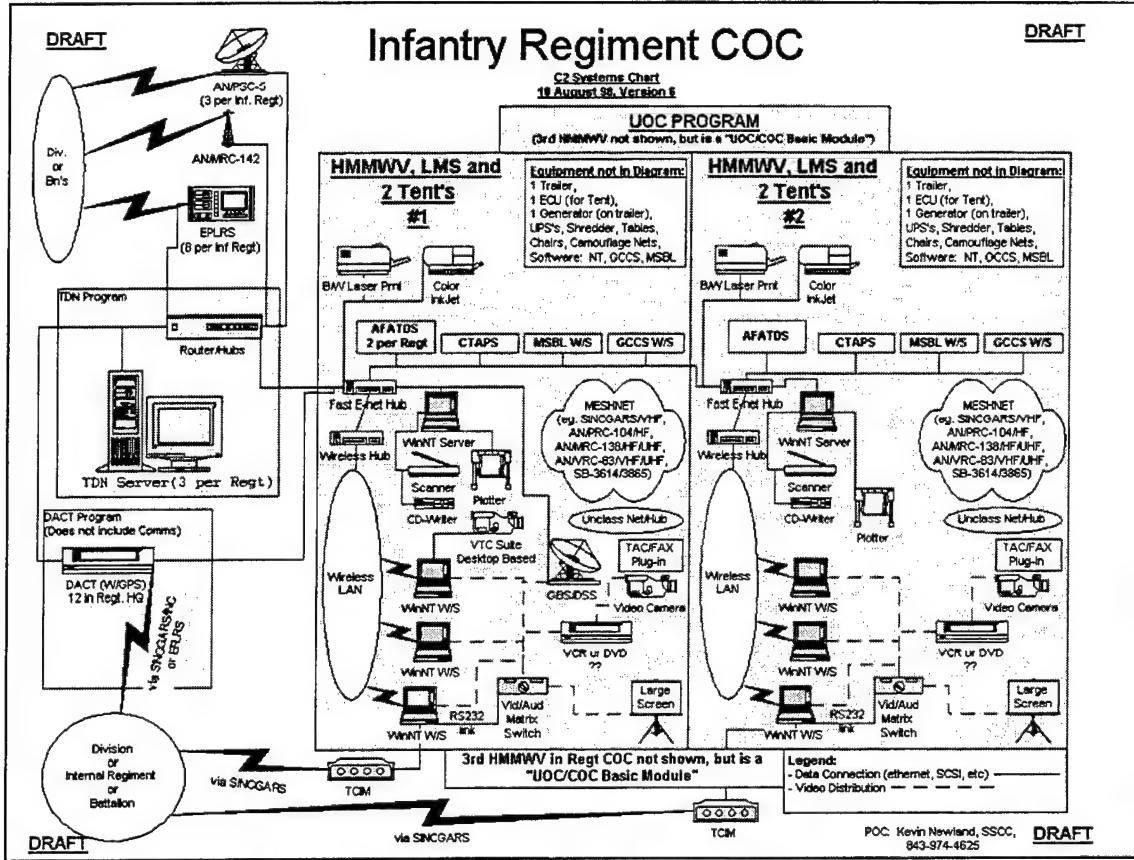


Figure 7: Conceptual View of the UOC [Ref. 28]

2. Existing Garrison C4I Architecture

A regiment's garrison architecture consists primarily of the camp or base telephone system and tools used for office automation. Since the telephone system is not maintained by personnel within a regiment, this research is focused on the office automation and networking aspects of the architecture.

The term office automation refers to the use of computer systems necessary to execute a variety of office operations, such as word processing, accounting, email, and collaborative planning. For the Marine Corps, office automation often implies a network of computers supporting a variety of available programs and functions designed to increase the productivity within a given organization. The functional capabilities enhanced by the network include electronic mail (Email), naval message traffic, print services as well as collaborative planning tools. Although there are several hardware and software products used by the Marine Corps, special attention is applied to the personal computers, network servers, network operating systems, physical distribution systems (local and wide area networks), Email applications, and message distribution software. It is important to consider each of these applications and the role they play in providing the automation required by 1st, 3rd, and 6th Marine Regiments.

a. 1st Marine Regiment.

The garrison architecture includes 2 servers running Banyan Vines, ATM switches, Ethernet hubs and switches, Category (CAT) 5 and fiber optic cabling, and well over 100 personal computers (PCs). Desktop and laptop computers are configured with the Windows 3.1 and Windows 95 operating systems. The office automation software packages primarily includes Lotus Smart Suite 96 with a few copies of Microsoft's Office 97 installed on selected machines. The Email applications employed are Shark Mail and Banyan Vines Blue Mail. The Message Distribution Subsystem (MDS) is the application program utilized for naval message traffic. The IT personnel support all members within

the regimental headquarters as well as the subordinate battalions. IT personnel spend the greatest amount of their time and energy maintaining and supporting the garrison C4I architecture as opposed to supporting tactical requirements.

b. 3rd Marine Regiment.

Although the garrison infrastructure for 3rd Marine Regiment is very similar to 1st Marines, the architecture is much more advanced. Consisting of a high-speed fiber optic backbone and CAT 5 distribution system, the unclassified garrison network provides connectivity to every major facility housing units within 3rd Marine Regiment. IT personnel from the regiment and Marine Corps Base Hawaii recently completed the migration from Banyan Vines to Microsoft's Windows NT operating system including the installation of three new servers for 3rd Marines. The regiment utilizes a total of ten servers for the garrison network; two NT servers supporting the functions of a Primary Domain Controller (PDC), Backup Domain Controller (BDC), Domain Name Service (DNS), Dynamic Host Configuration Protocol (DHCP), Windows Internet Name Service (WINS), and a Remote Access Service (RAS); two NT servers supporting Microsoft Exchange; one NT server supporting file sharing and print service; one NT server supporting Unit Diary/Military Information Personnel System (UD/MIPS); one NT server supporting Internet Information Exchange (IIS 4.0) and Outlook Web Access (this will also support the internet web and FTP functions); and two supporting Banyan Vines. Since all of the battalions within the regiment were unable to completely migrate to Windows NT, the regiment continues to operate and maintain Banyan Vines.

Although 3rd Marines has begun utilizing Microsoft Outlook for Email, public folders, and naval message traffic purposes, they continue to support Beyond Mail and the Message Dissemination Subsystem (MDS) for select users and as a precautionary measure. The primary office automation software package is Microsoft Office 97 with Lotus Smart Suite 96 installed for legacy purposes.

The challenge for 3rd Marines' architecture can be found in its PCs. They do not have the quality or quantity of desktops, laptops, and peripheral devices found in the other regiments. Very few staff officers are assigned a laptop computer for their use in garrison, in the field, or even while on travel. Although the average age and processing capability of their desktop computers is acceptable to its users, most PCs fall short with regard to meeting the Information Technology for the 21st Century (IT21) standards published by the Navy and Marine Corps. These deficiencies in quality and quantity add significantly to the number and types of trouble calls supported by the IT support section.

A significant capability for 3rd Marines is the establishment of a classified network within the garrison Command Post (CP). This network provides the regiment with an opportunity to train its personnel on those systems employed in a tactical environment (i.e. TCO, IAS, and IOW) as well as provide the necessary automation for classified information systems such as message traffic, Email, and processing classified office automation tasks. Since 3rd Marines is the senior command aboard Marine Corps

Base, Hawaii, they are also provided with the Global Command and Control System (GCCS) which is set up in the garrison CP.

c. 6th Marine Regiment.

The IT personnel from 6th Marine Regiment also spend the greatest amount of their time and energy maintaining and supporting the garrison C4I architecture. IT personnel support approximately 200 users from the headquarters element with email, print services, and office automation requirements. The garrison architecture for 6th Marines includes the use of six computer platforms employed as Banyan Vines and Lotus Notes servers. Although the processing speeds and storage capacities are rather limited, these platforms currently support all email, naval message distribution, print services, and collaborative planning capabilities while in garrison. The regiment has a mixture of PCs including a variety of manufactured desktop and laptop systems. The network topology within unit buildings is comprised primarily of Unshielded Twisted Pair (UTP) Category Five (CAT 5) cable, while the infrastructure between buildings and among other units aboard Camp Lejeune is mostly fiber optic cable. Albeit the regiment is currently connected to division and other units aboard the base via High-level Data Link Control (HDLC) circuits and dedicated T1 links, improvements are schedule within the next six months as well as a migration from the Banyan Vines Network Operating System to Microsoft's Windows NT.

Although the server platforms currently employed by 6th Marines will not support the Microsoft Windows NT migration, they are scheduled to receive new

machines with sufficient memory, storage and processing speed capable of supporting the NT operating system. In addition to the server platforms, 6th Marines is also scheduled to receive the appropriate network distribution hubs and switches necessary for connectivity into the fiber backbone aboard Marine Corps Base, Camp Lejeune. All upgrades to the existing architecture and NOSs are scheduled for completion prior to 31 May 1999.

3. Existing Tactical C4I Architecture

The regimental tactical C4I architecture is designed to provide integrated systems intended to support effective command and control of combat operations for the commander. The focal point for executing combat operations is the regimental Combat Operations Center (COC). It is the location that receives, maintains, and updates the Commanding Officer's battlefield information requirements. It is also the field activity used by the commander and his staff for combat decision-making as well as operational command and control of its forces.

There are several functions that are performed in the COC including: (1) Receiving and recording operational reports from subordinate elements. (2) Maintaining and displaying the current friendly and enemy situations. (3) Preparing and submitting operational reports to higher headquarters. (4) Issuing and supervising the Commanding Officer's orders to subordinate elements and providing copies to higher headquarters as required. (5) Monitoring and reporting the progress of regimental tactical operations. (6) Monitoring the status of combat essential equipment and supplies. (7) Planning, coordinating and executing the use of supporting arms. (8) Advising staff sections and

subordinate units of events or pertinent information of immediate concerns. (9) Serving as the principal point of contact for liaison personnel from subordinate, supporting or adjacent tactical elements. (10) Conducting, in coordination with higher headquarters, concurrent and future battle-planning [Ref. 15, 2-3].

There are several variables that may affect the specific COC configuration ranging from the availability of assets to mission requirements and desires of the Commanding Officer. The COC is designed to provide a workspace for the functional mission areas of intelligence, force protection, fires, maneuver, air support, logistics and command and control. The COC is generally organized to efficiently display combat essential information in a way that facilitates decision making. Map boards and video display units are placed to allow viewing without disrupting the flow of work. Communications equipment is located in the appropriate place to support operations while enhancing the Commander's ability to influence the battle.

Although all COC's have similarities in function and design, each regiment typically modifies the configuration to better support the flow of information and personality of its Commander. A typical COC configuration includes assets supporting the Main Command Post (CP), an antenna farm housing the communications equipment, and the Forward CP. Although the distances between these operational assets vary, an illustration of 1st Marines' COC layout and communications paths are shown in Figure 8.

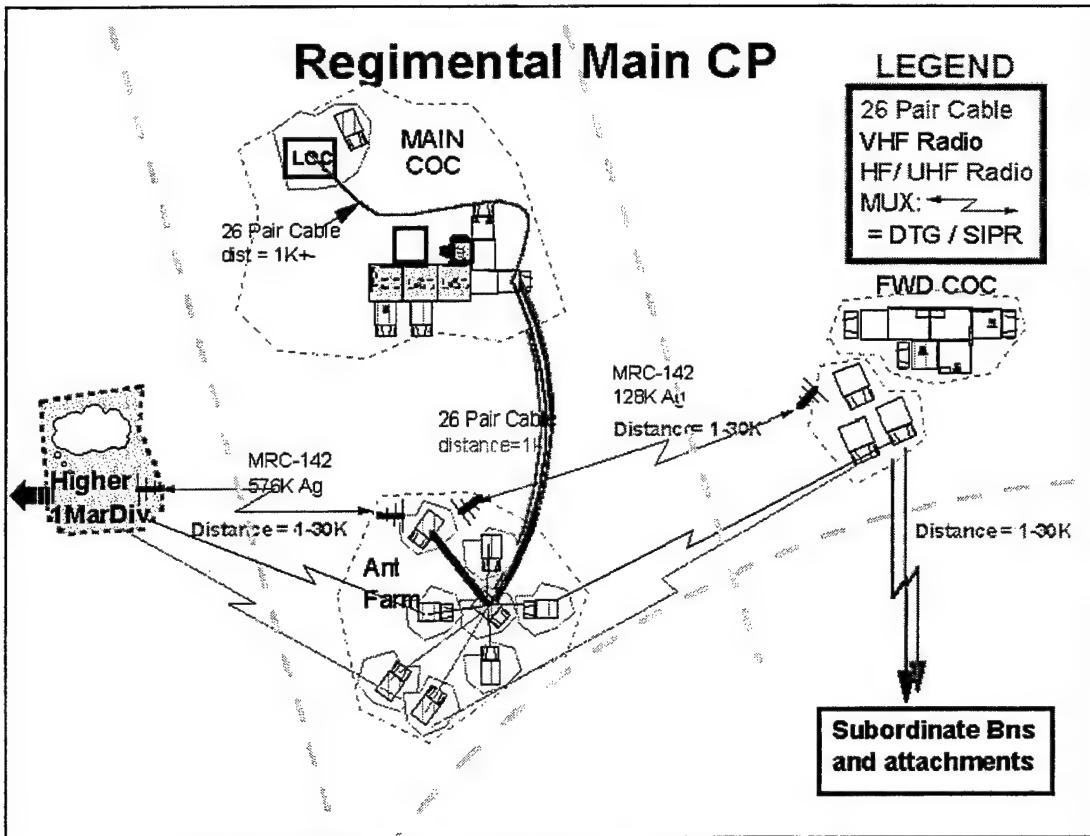


Figure 8: Regimental Combat Operations Center Layout

a. 1st Marine Regiment.

1st Marine Regiment utilizes two COC configurations. The smallest is referred to as the Forward CP (see Figure 9). Employed on short notice, this arrangement is comprised of the forward echelon from the headquarters and is concerned with the tactical control of current operations. The Forward CP is typically deployed when supervision of a critical phase of the operation is required, when the Commander feels the need to directly influence the battle, or when it becomes necessary to facilitate combat operations during displacement of the Main CP.

The primary means of providing communications for the Forward CP is through single channel radios. The regiment employs the appropriate number of vehicle mounted and man portable High Frequency (HF), Very High Frequency (VHF) and Ultra High Frequency (UHF) radio systems required to provide the communication links necessary for the mission. The names applied to these radio links are reflected in Figure 8. Additional communications are provided via the Unit Level Circuit Switch (ULCS) system as discussed in chapter two of this document. The primary purpose for the ULCS system is to provide the digital communications necessary for the secure telephone system and data communication devices utilized by the regiment.

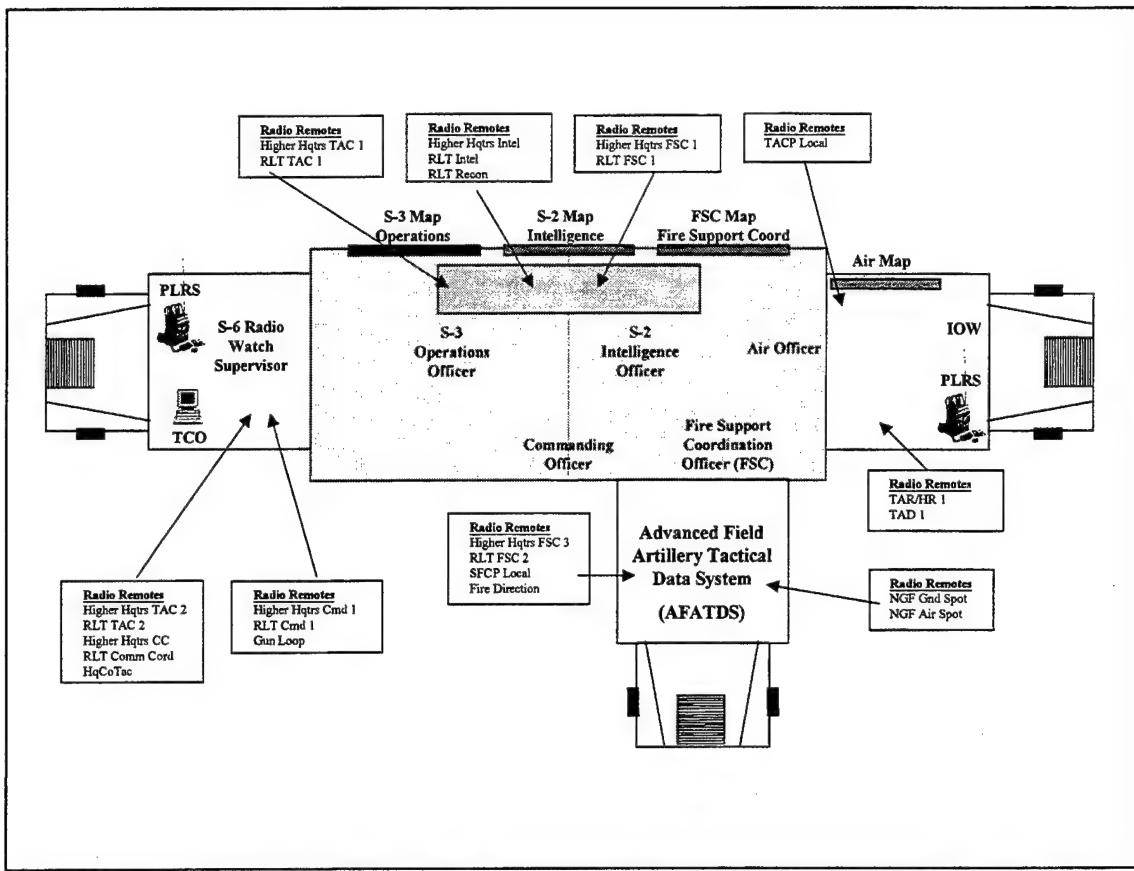


Figure 9: 1st Marine Regiment's Forward Command Post

The second COC configuration (see Figure 10) is referred to as the Main CP. The Main CP is the principle headquarters of the Regimental Commander and the primary facility from which the staff performs their duties. Unless a Forward CP is being utilized, the Main CP is where current operations are controlled and planning for future operations is performed. Both CP configurations reflect the use of single channel radio nets, multi-channel communication systems, supporting telephone connectivity, and limited information systems for data communications via TCO, IAS and IOW.

The Main CP for 1st Marines reflects how the commander is able to structure and control the flow of information within the COC. The display of essential

information is accomplished via the IOW workstations that are subsequently connected to the proxima projector. Map boards for the functions of intelligence and force projection are in the center with fires and air on the left and maneuver on the right. Shared communications assets such as the tactical fax machine and computer workstations are moved off to the side. Even though this regiment is utilizing systems such as TCO, IAS, and IOW as a method for improving the flow of information, their primary means of controlling operations is via radio operators and single channel communication devices. Although the procedures used for handling the transmission and receipt of radio message traffic are unique, the typical process is shown in Figure 11.

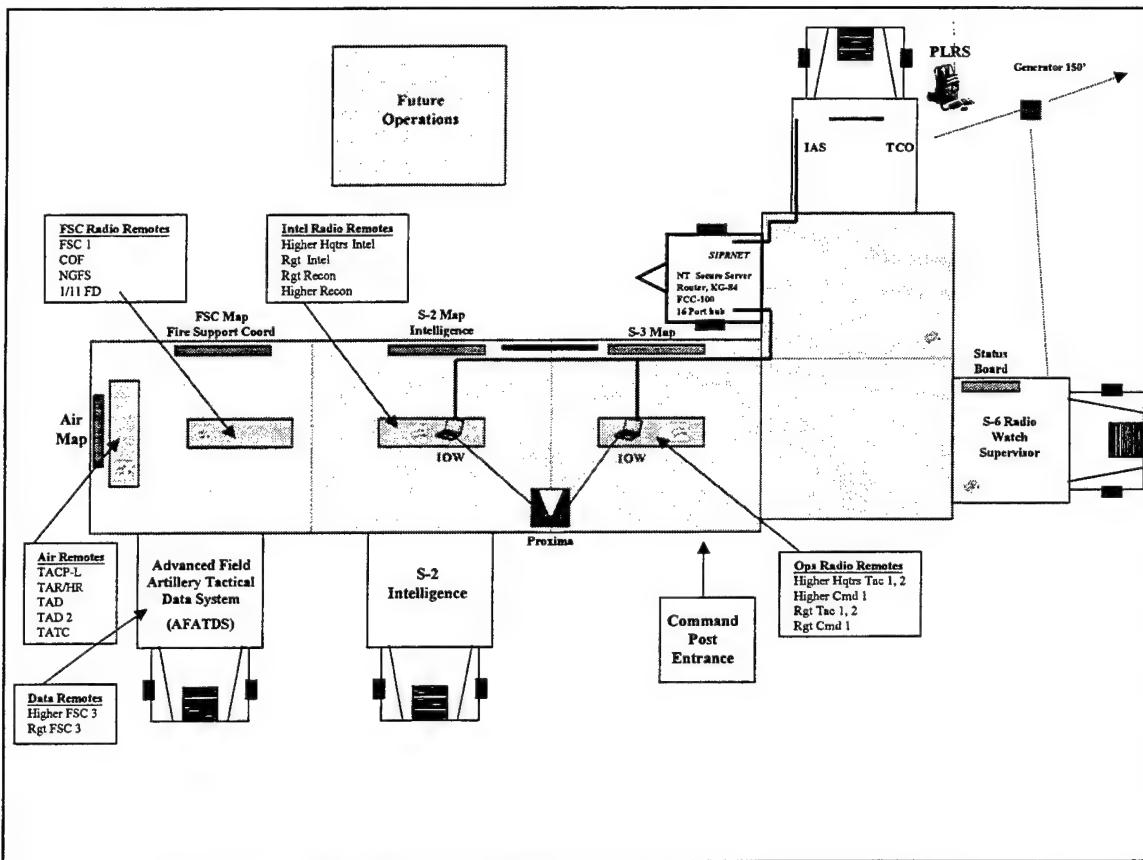


Figure 10: 1st Marine Regiment's Main Command Post

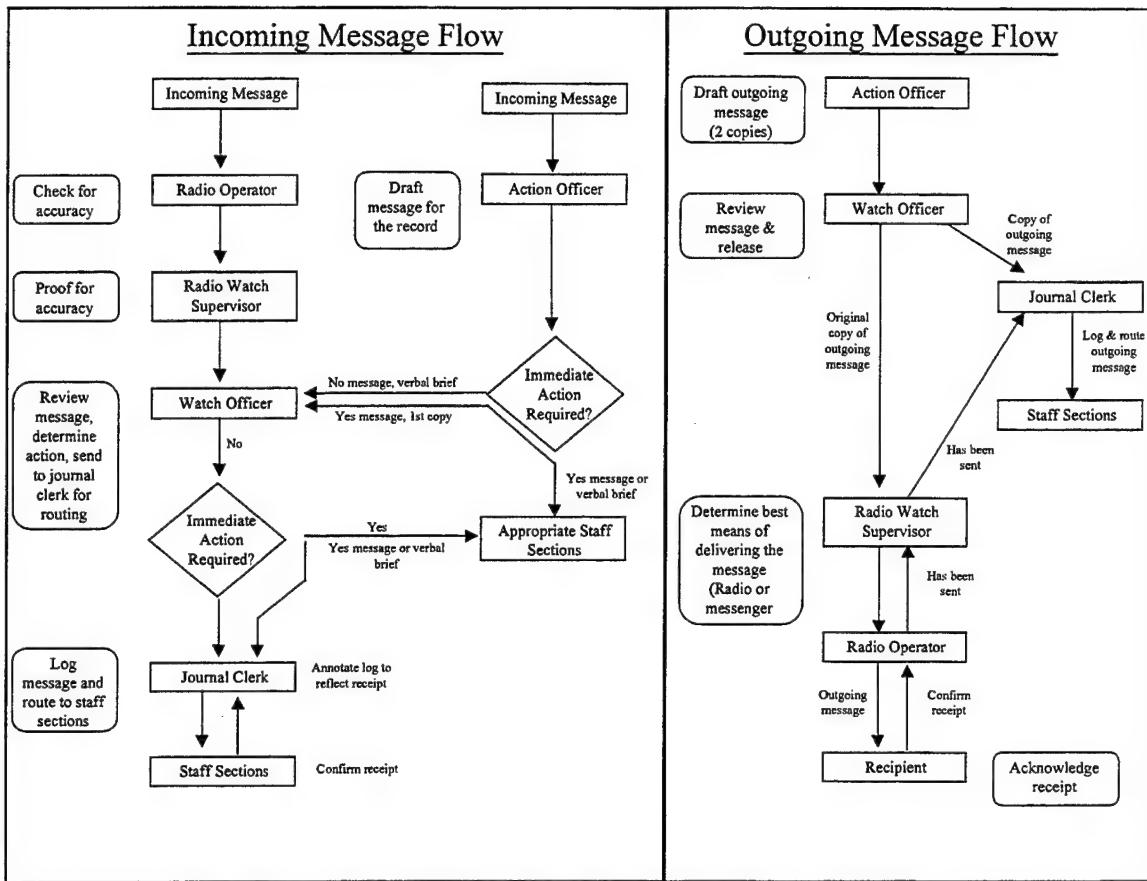


Figure 11. Message Handling Procedures [Ref. 15, 2-12]

A radio operator receives an incoming message and transcribes the information onto a document called a “yellow canary.” This message is then forwarded to a radio supervisor and subsequently the watch officer after it has been checked for accuracy. The watch officer determines the type of action required. If immediate action is necessary he forwards the yellow canary to the appropriate individual. If not, the document is given to the journal clerk were it is logged and routed to the appropriate section. Outgoing messages are handled in a similar fashion beginning with the action officer and ending with the radio operator. Although this process reflects those procedures implemented by 3rd Marines, all three regiments follow the general concept. This process reflects yet another area of support required by regimental personnel.

b. 3rd Marine Regiment

Similar to 1st Marines, 3rd Marine Regiment also utilizes two COC configurations. The Forward CP (Figure 12) and Main CP (Figure 13) are designed and employed to support the same functions as addressed. The Commander's perspective and his personality typically reflect the primary differences between each regiment's CP configuration. Other differences among these regiments include the use of an Initial Fire Support Automated System (IFSAS) for 3rd and 6th Marines while 1st Marines uses the Advanced Field Artillery Tactical Data System (AFATDS).

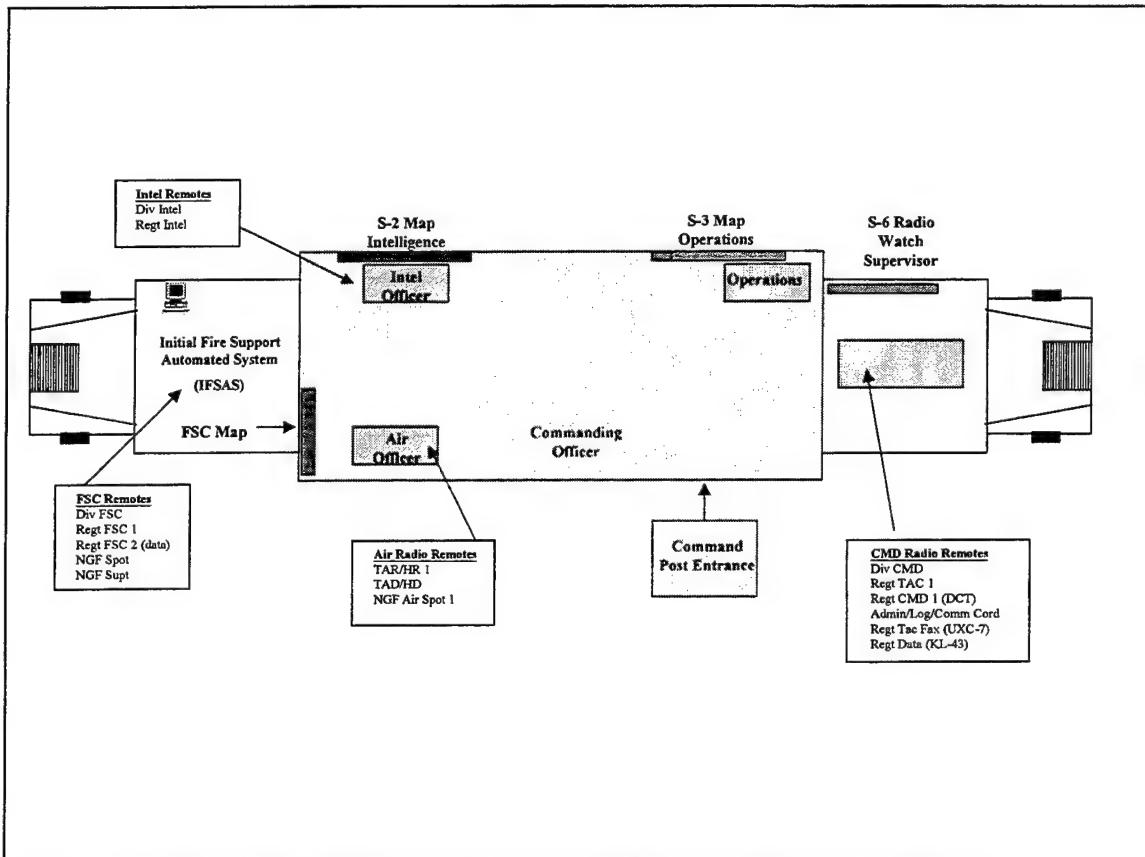


Figure 12: 3rd Marine Regiment's Forward Command Post

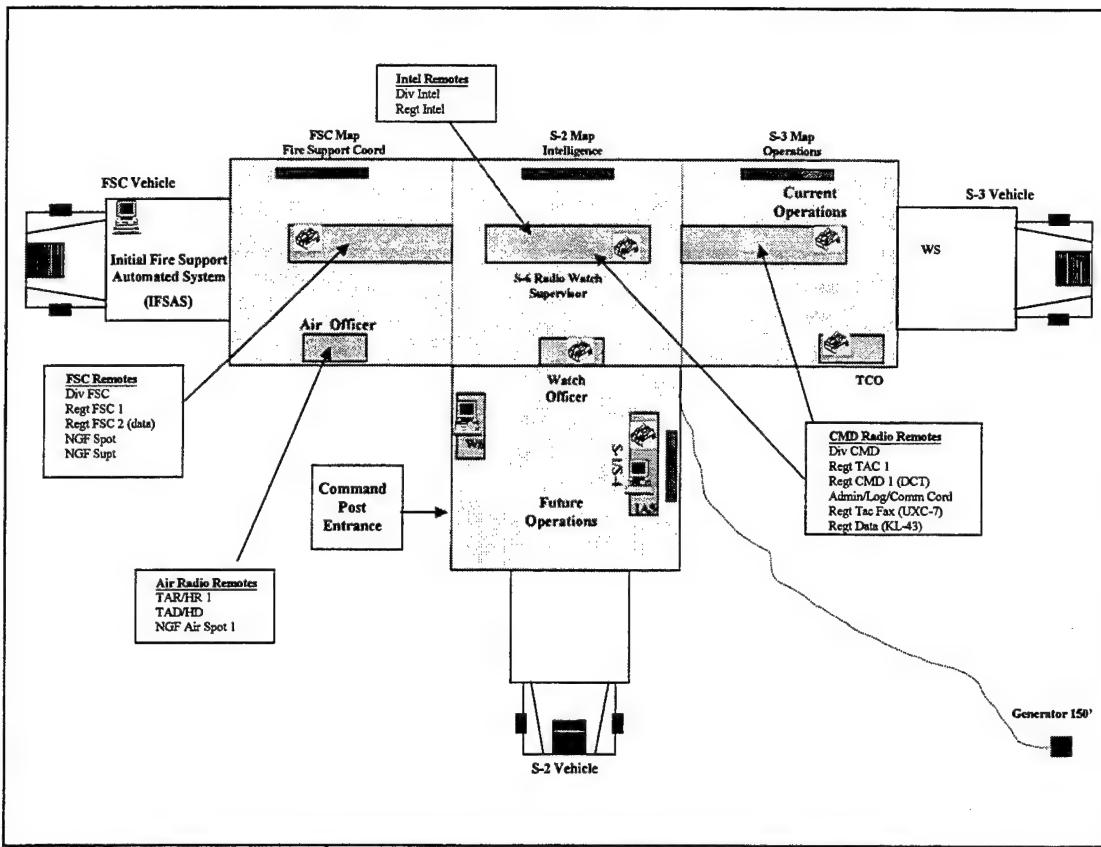


Figure 13: 3rd Marine Regiment's Main Command Post

c. 6th Marine Regiment.

The CP configuration for 6th Marines is only slightly different than those identified for 1st and 3rd Marine Regiments. The primary difference for this regiment is the tent layout used to support the Main CP. As illustrated in Figure 14, 6th Marines employs a square configuration vice the typical rectangle shape of the other two regiments. The use of single and multi-channel radio systems and information systems remains relatively consistent with the 1st and 3rd Marine Regiments. One significant difference between 1st Marines and the other two regiments is the use of Position Location Reporting System (PLRS). For 1st Marines, this system is integrated into the

design of the CP while 3rd Marines is not fielded with the system. PLRS is designed to provide tactical units with the ability to track unit locations through an automated process. Without a system like PLRS, subordinate commands must constantly provide unit locations and updates via the chain of command.

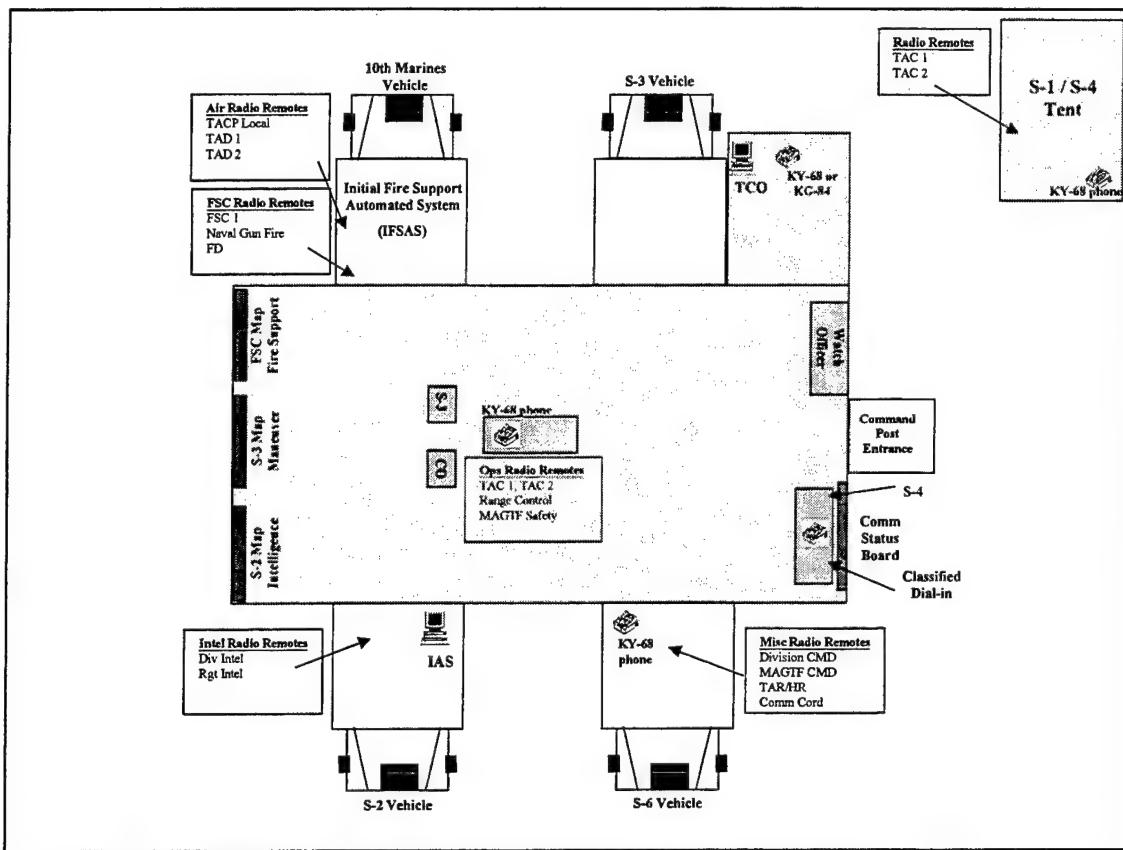


Figure 14: 6th Marine Regiment's Command Post

IV. INFORMATION TECHNOLOGY RELATED SKILL SETS

Technology has spawned the growth of several emerging C4I systems designed to support functional mission areas of C2, intelligence, force protection, fires, maneuver, air support, and logistics. This growth in IT also has sparked an increase in the procurement rate of personnel computers and peripheral devices supporting office automation, message distribution, and electronic mail packages. Although the procurement and addition of these information systems provide much needed capability, they bring added difficulty regarding the support and maintenance of modern C4I architectures and their systems. Additionally, these devices typically require advanced training, greater sophistication, and higher skill levels regarding systems integration, assurance, and infrastructure support.

The ability to install, operate and maintain modern information systems in the Marine Corps is very similar to supporting war fighting skills such as weapons operation, navigation, operations planning, and embarkation. The skills need to be thought through, well understood, documented, and trained to on a regular basis within a realistic environment. The Marines supporting information systems in a regiment often find themselves faced with several unique challenges ranging from the architecture and its systems, to the training required for support. The IT architecture for a regiment is dynamic by nature as phased modernization creates interoperability issues coupled with vastly differing IT knowledge bases and skills of its people. Adding to the complexities

of the changes to information systems are the challenges of finding the time and money required to provide the necessary training of IT support personnel.

The Marine Corps applies Individual Training Standards (ITS) to every occupational specialty (MOS) as a method of evaluating mission performance capabilities, proficiencies of individual Marines, and a tool for monitoring training impacts on career development. In order to appreciate the IT skill sets required within a regiment, it is important to first consider the process used in developing the ITS and their relationship to IT services and support. Additionally, consideration must be given to all potential shortcomings of ITS for the IT related MOS's such as 0602, 2542, 2549, 4002, 4066, and 4068. Finally, provide the identification of IT support required by specific C4I systems fielded as well as those scheduled within the next eighteen months.

A. INDIVIDUAL TRAINING STANDARDS (ITS)

Developed by the Subject Matter Expert (SME) Conference, ITS incorporate the mission outputs as well as core and core plus skills identified by the Training Review Group (TRG). This document has six major components: task, condition (s), standard, performance steps, reference (s), and administrative instructions. Tasks are further divided into a task number and task description. This component provides a clearly stated account of the performance-oriented action requiring a skill. The condition statement establishes the environment in which the task is to be performed. A standard is used to set the proficiency level expected. The performance steps outline the actions required to fulfill the proficiency expected by the established standard. If a reference is

provided, it typically applies to doctrinal publications or appropriate specifications that validate the performance steps. And, administration actions provide additional information relating to safety, potential limitations, or special circumstances relating to the task.

B. PROBLEMS WITH EXISTING TRAINING STANDARDS

1. Occupational Field Merger (MOS 06XX)

The process of merging data communications and communication systems occupational specialties originated in 1996 with the establishment of an 0602 MOS (only applied to officers). This merger brought the 2502 and 4002 MOS's together creating the Communications Information Systems Officer specialty within the Marine Corps. Through empirical studies and Subject Matter Expert (SME) conferences, this process continued to evolve by identifying similarity of tasks, performance steps, and the mechanics of conducting a merger for the enlisted specialties. Success for this merger will depend largely on proper identification of skills and appropriate training required by Marines assigned to these occupational specialties.

2. Influx of New Equipment (TCO, IAS, and IOW)

In the current post-Cold War era of downsizing and reduced budgets, Marines, tasked with new and expanding missions, are expected to do more with less. This concept applies equally to the regiment. Over the past twenty-four months the regiment has received a substantial influx of data communications equipment including personal computers, servers, switches, routers, and cabling. In addition, the regiment has received

the TCO, IAS, and IOW systems and others (TDN and UOC) arriving within the next twenty-four to thirty-six months. Although the Operational Requirements Documents (ORDs) for some of these systems (TCO, IAS, and IOW) reflect that no manpower requirements are anticipated, the opposite result has occurred. As a consequence of system implementation (TCO, IAS, and IOW), units find themselves concurrently supporting previous methods of operations (use of “yellow canaries” and map boards) while trying to learn and develop employment methods for new automation tools.

C. REQUIRED SKILL SETS

Evaluating these systems individually and their impact on consolidation with each other as well as legacy systems into an integrated network must be accomplished. Applying a Systems Approach to Training (SAT) methodology and portions of the Instructional Systems Development (ISD) Model to TCO, IAS, IOW, TDN, and other systems; a series of task descriptions and performance steps can be derived. Prior to the creation of task descriptions or performance steps, the duty areas for each task must be established. Finally, skill set consideration must apply to the entire organization. Identification of skill sets necessary by a single MOS would not account for the training aspects and skills necessary to fully install, operate, and maintain the entire system.

1. Duty Areas for Information Technology Skill Sets

Duty areas are used to address a category or grouping of the tasks required to support the identified system. The duty areas required to support IT assets include six categories: resource management and administration; data communications support; data

communications systems; local and wide area networks (LANs/WANs); application systems; and network/systems assurance.

a. Resource Management and Administration.

Resource management and administration includes those functions relating to the accountability and control of data communications equipment. Although senior Marines typically carry out these tasks, all personnel should be familiar with the requirements of resource management and administration. Marines involved in supporting information systems must have a thorough understanding of the equipment as well as its intended use for operations. They must know how to properly supervise and train other Marines; identify mission activities and information exchange requirements necessary to employ the system properly; and finally, those personnel supporting information systems must understand the organizational structure as well as the functional mission of others within the unit.

b. Data Communications Support.

Data communications support focuses on the planning and supervision aspects of supporting information systems. Data communications support includes the functions of planning for data communications requirements; performing systems engineering; writing data communications documents; addressing power and maintenance issues as well as accounting for embarkation, deployment, and maintenance of the information system.

c. Data Communications System.

Data communications system addresses the detailed issues of installation, operation, and maintenance with regard to the information system and support required by the customer. Data communications system also includes the functions of configuration management, troubleshooting techniques, communications between and among other systems, as well as the mapping activities necessary to distribute data and other information that must be integrated with other devices.

d. Local and Wide Area Networks (LANs/WANs).

Planning, configuring, and operating networks has become such a time consuming effort that it has grown into a separate and distinct function with regards to IT support and customer service. In addition, support required for the network includes installation, operation, and maintenance of network systems; planning and management of network protocols, supporting connections between despaired networks; as well as mapping platforms, locations and other systems on the network.

e. Applications System.

The duty areas for applications system is broken out as an effort to identify specific applications that require special attention and support. Specifically, this duty area addresses the installation, operation, and maintenance of database management systems (relational and object oriented); World Wide Web development tools; network operating systems; MSBL; and system administration requirements.

f. Network/Systems Assurance.

Although assurance requirements typically provide criteria from which to evaluate how well the system adheres to other requirements, network/systems assurance also addresses analysis of covert channels, trusted recovery, security testing, and continuous protection issues for the individual systems, the collection of systems and the functionality of the network. Specific functions include system and network security as well as the installation, operation, and maintenance of encryption systems.

2. Task Description and Performance Steps

The Instructional Systems Development (ISD) Model (Figure 15), established in 1976, defines a process of analyzing, designing, developing, implementing, and controlling the aspects of standardized skills and military training. This methodology became an institutionalized process adopted by all services and was later renamed the Inter-service Procedures for ISD. Applying a portion of this process to TCO, IAS, IOW, and TDN yields the desired task descriptions and performance steps necessary to support these information systems.

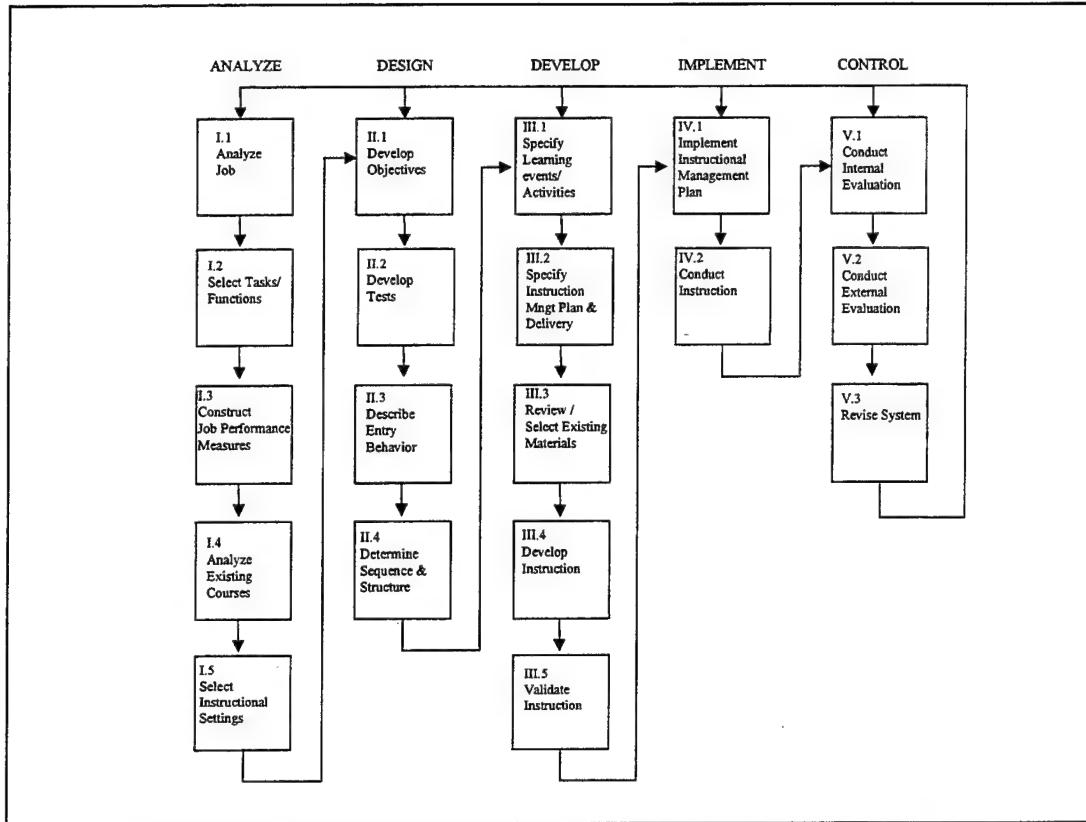


Figure 15: Instructional Systems Development Model [Ref. 4]

The first step is identifying that a problem exists and subsequently a need to revise the existing system (V.3 under control). Job requirements must be analyzed (I.1), selected tasks and functions identified (I.2) and finally, performance measure must be constructed (I.3). For the purpose of this research, the task description and task identification are listed under each duty area followed by the same task description with all associated performance steps necessary to accomplish identified tasks listed on subsequent pages. Results from this analysis are shown in Appendices A, B, C, and D. From these results, three functional areas of IT support have been identified: system applications, infrastructure, and system assurance.

Success for any training standard reengineering or restructuring initiative depends greatly on the sound development of a training and competency model. Understanding the methodology utilized to develop tasks and performance steps marks the beginning of this process. The next step is to analyze task results and categorize them into competency levels with comparable skills, experiences, and training required for the appropriate military grade.

3. Competency Levels

When addressing competency levels within an organization it is important to distinguish the number of levels as well as the skills, knowledge, and experiences required by those assigned to each layer in the hierarchy. The competency pyramid displayed in Figure 16 reflects the use of three levels: basic core; core plus; and advanced competencies. The use of core and core plus is similar to those established by the Training Review Group (TRG) with an association to the level of skill sets required by workers and supervisory personnel. The introduction of an advanced level is necessary to accommodate advanced training, greater sophistication, and higher skill levels required by senior enlisted personnel tasked with supporting modern C4I systems.

Although the competency pyramid addresses three core functions of IT support, the aspects associated with specific applications are left out. It is important to separate the responsibilities of an operator/maintainer from those of systems administration, application integration, infrastructure management, and systems assurance. Individual applications and support responsibilities must be considered.

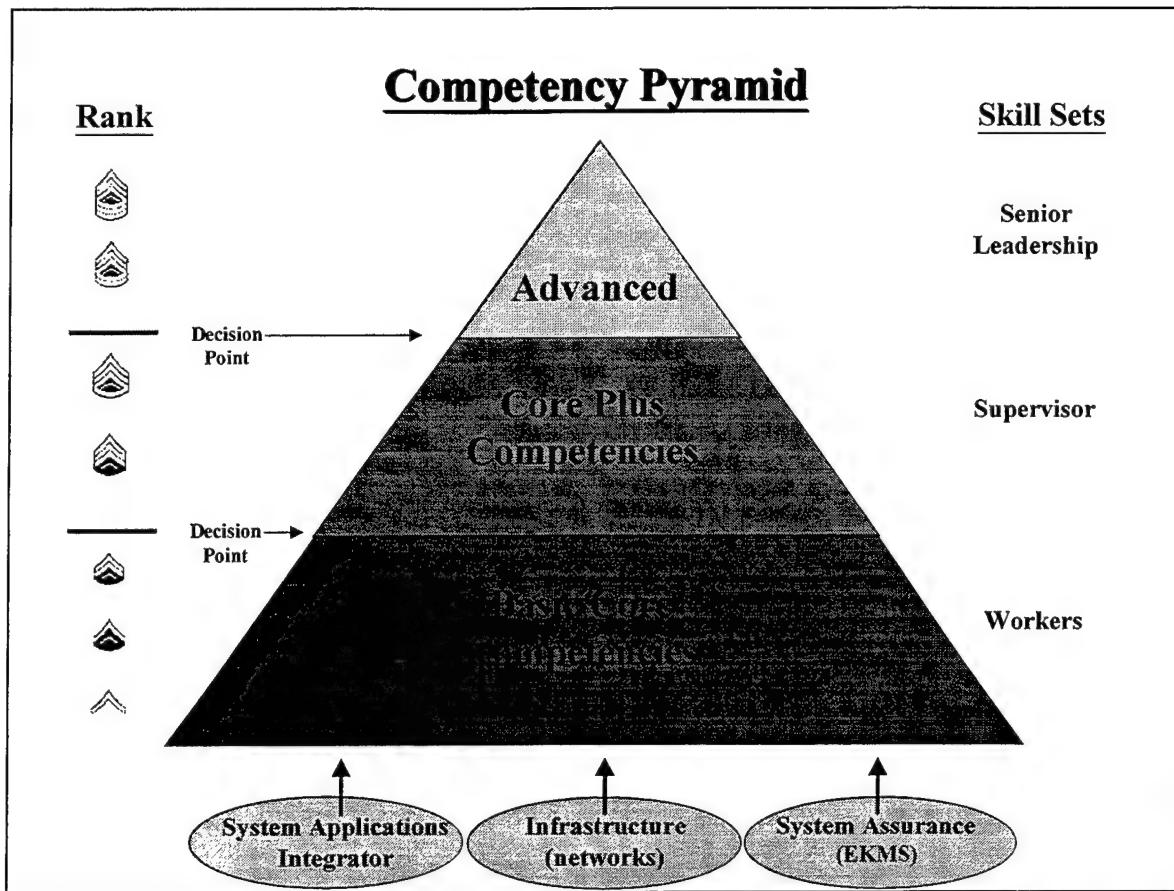


Figure 16. Recommended Competency Pyramid

a. Core Competencies.

The competency pyramid is built upon three distinct areas of IT support: application integration, infrastructure management, and systems assurance. All three feed directly into the core competencies which includes basic skills regarding: reduced instruction set computer (RISC, UNIX processor) operating systems (OS); complex instruction set computer (CISC, Intel processor) OS; Windows NT OS; Exchange and Outlook Web servers; LAN/WAN; router configurations; IP routing; hubs and switches; MCHS; MSBL; systems assurance; troubleshooting; applications; DBMS; and customer support. Although the skills and knowledge required at the core competency level is the

same for all three functional areas of IT support, specialized training is required to enhance those unique skills necessary for each occupational specialty.

b. Core Plus Competencies.

Core plus competencies include those identified as basic as well as additional skills associated with leadership, process analysis, technology strategies, training and development, and customer support. The most crucial section of the competency pyramid is at the supervisory level. Specific competencies for a Marine following the infrastructure path include additional training for: infrastructure planning and support, LAN/MAN/WAN, two and three tier architectures, servers, firewalls, routers, bridges, hubs, switches, and customer support.

c. Core Advanced Competencies.

Advanced competencies apply to the senior enlisted leadership within an organization. Although a regiment does not have Marines of this rank assigned to support IT requirements, they do exist within a Marine Corps division. The skills associated with this level include those identified as core and core plus in addition to those necessary for the proper supervision and leadership expected of a Marine Corps Gunnery Sergeant and Master Sergeant. These individuals play a key role in the development of junior Marines from both levels through their capability to motivate, influence, and inspire others to follow the vision and values entrenched in the Marine Corps. The establishment of a senior leadership pool capable of providing the guidance

and direction necessary for subordinate Marines is a critical element within every organization.

4. Military Occupational Specialty (MOS) Progression

The typical progression for a Marine entering the radio communications field begins with the training necessary to become a skilled radio operator (assigned the 2531 MOS). Later in his/her career, this Marine receives the training necessary to become a radio chief (assigned the 2537 MOS) followed by additional schooling for a communications chief (assigned the 2591 MOS). The grade levels (or decision point) necessary to obtain additional training occur between Sergeant to Staff Sergeant for a radio chief and Gunnery Sergeant to Master Sergeant for a communications chief. MOS progression within IT support areas (4066 and 4068 MOSs) do not follow this general pattern. The typical progression for these occupational specialties is to remain a 4066 or 4068 until the rank of Master Gunnery Sergeant (MGySgt). Upon promotion to MGySgt, the MOS assignment is changed to 4099.

The “recommended IT MOS Progression Model” illustrated in Figure 16 identifies several potential solutions for the development and advancement of Marines assigned to support information systems. Considering that 67% of the Marine Corps consists of personnel in their first enlistment, attention must be given to the competencies an individual can achieve during an initial four to six year period. Additionally, a new perspective regarding the advancement of Marines performing typical functions of a worker to those of a supervisor are addressed. Finally, the necessity to roll-up system

assurance functions into application integration and infrastructure management once a Marine advances to a supervisory level is discussed.

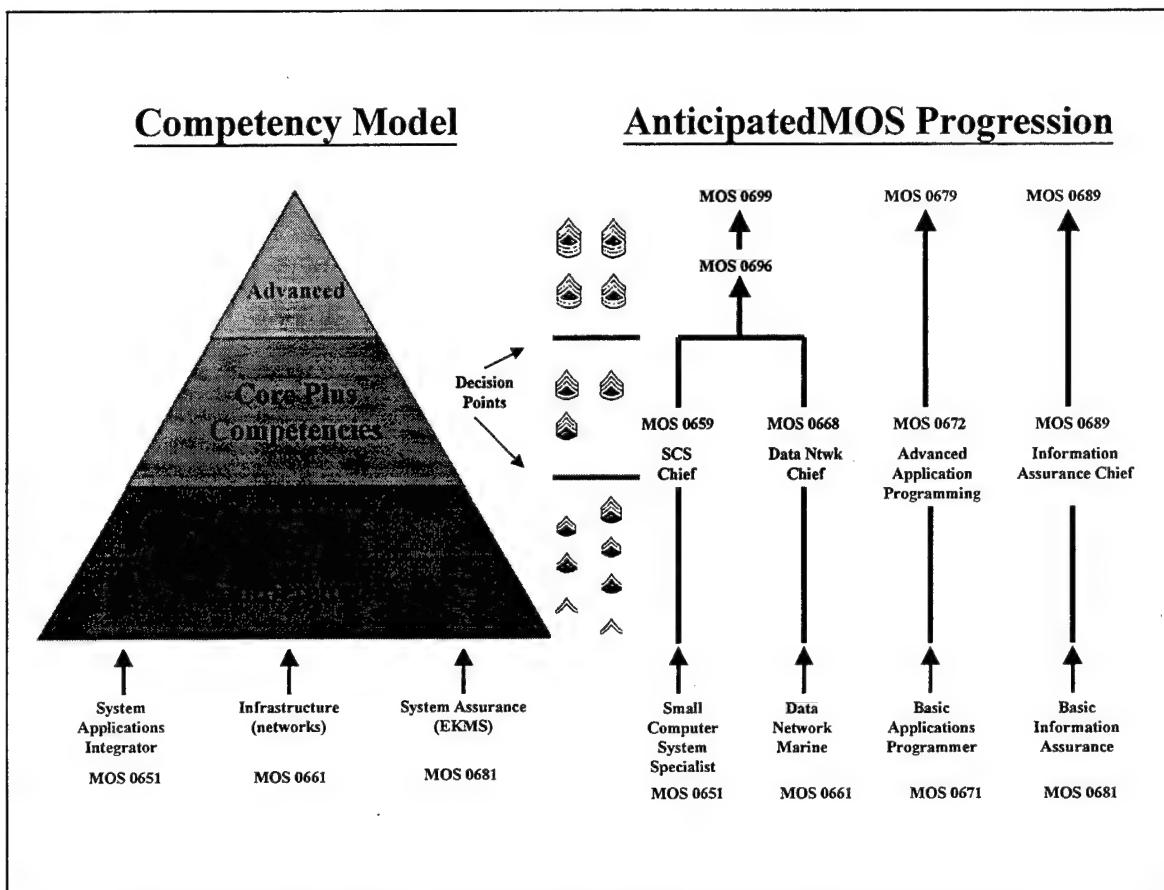


Figure 17. Information Technologies MOS Progression Alternatives

Recommended IT MOS progression alternatives show a comparison between the Competency Model addressed earlier and an anticipated MOS structure provided by the occupational field sponsor. The proposed MOS model addresses the use of four initial occupational specialties assigned the duties of Small System Specialist, Data Networks, Application Programmer, and Information Assurance. As Marines assigned to these occupational fields advance in rank they are assigned new specialties associated with their skill and training. Further advancement for the Small System Specialist and Data

Network Marines result in the assignment of an Information Systems Chief and subsequently a Communications Chief. Applications Programmer and Information Assurance specialists remain in a single track their entire career. Although several differences exist between the Competency Model and the anticipated MOS progression, three key areas require special attention: (1) required rank (location of the decision point) necessary to achieve the next level of competency training; (2) multiple MOS progression paths; and (3) functional responsibilities.

The issue of assigned competency levels is not one of military rank, but one of experience, knowledge, and training. Consider a Marine entering the process as an applications integrator, he/she receives the appropriate training from a typical schoolhouse with subsequent training provided by the operating forces (OJT). Within a two-year period this individual is most likely ready for additionally training and possibly promotion to Corporal. Delaying until the Marine is promoted to Sergeant may result in the individual becoming ineligible for additional training because of time remaining on their enlistment contract or possibly reassignment. The end result is much more than another missed opportunity for training, yet a means by which the Marine Corps could address issues of retention, staffing, and competencies for our junior Marines.

The MOS progression reflected in the Occupational Field Sponsor's model suggests a pattern similar to the existing 40XX structure. Although the Small Computer System Specialist and Data Network Specialist merge, the Applications Programmer and Information Assurance functions remain in a "stove pipe." The Competency Model

proposal suggests implementing three occupational fields into the core competencies. Roughly eighty percent of the training would be provided jointly with the remaining twenty percent focused on individual specialties. The functions of application integration and infrastructure management must include the aspects of systems assurance. For this reason, system assurance is rolled up into both functions at the core plus level. The final result is a pyramid structure supporting the progression of all three occupational specialties.

The third difference between the two proposals is the establishment of an applications programmer. The question that should be asked is, "Does the Marine Corps need programmers?" If the answer is yes, then outsourcing may be an alternative solution. If outsourcing is a solution that can be applied to this requirement, the focus for training would be directed towards the officers and their ability to manage contracts, vice the development of application programming skills.

D. IMPLEMENTATION

In an effort to adequately address the spectrum of IT skills required, the Marine Corps must begin to identify existing deficiencies. These deficiencies include the problems associated with ITS, IT related MOS structure, and support concepts for the installation, operation and maintenance of information systems. The difficulties found in the ITS can be addressed by implementing the proposals introduced in this chapter and subsequent appendices. The problems associated with a MOS hierarchy are much more difficult.

The first step should be to recognize that some individuals enter the service for training. Once that training is received, some will elect to reenlist while others decide to end their tour and return to the civilian sector. Take advantage of this trend by requiring individuals to enlist for six years vice four. Provide the training necessary for core plus competencies to Marines within the first three years of their enlistment allowing operational units to receive sufficient benefits from the training provided to these Marines prior to the end of their contract. Additionally, organize the occupational field into a single hierarchy vice three individual structures.

Finally, begin to address problems associated with system training, involvement, and experience required by other staff sections within the organization. One of the toughest challenges facing any recently developed C4I system is that it is new and sometimes unique (to most Marines). Consequently, there is an inherent distrust and dislike for the new device. Often, those tasked with implementing a technology don't understand it, don't know how to apply it, and often let the system sit on the shelf. Fixing this problem is not simple. There are several key factors that affect the success or failure of any command and control information system or technology. These factors can be broken down into three categories: training, involvement, and experience.

1. Training

Training is the single most important factor that will determine the success or failure of any system. Despite that fact, when Marines are not effectively trained on a system's capabilities and its uses, they do not learn the procedures necessary to get

desired results. Once frustration with the system sets in, Marines often revert back to old methods of accomplishing the mission, thereby negating any potential benefits of a new system. An example of this process is found in the employment of TCO, IAS, and IOW. Although regiments exert significant amounts of energy trying to employ these systems, the primary means of controlling information flow remains the use of single channel radios and yellow canaries.

2. Involvement

Training is not limited to system administrators and operators. Training must involve a commander, his staff, subordinate commanders and their staffs, and junior Marines who work on the system. If top leadership is not concerned or involved, success with a system will most likely fail.

3. Experience

One way Marines gain experience is by receiving proper training and applying that training in different scenarios and exercises. Through training, Marines become familiar with a system's capabilities and gain confidence in their abilities to provide the commander with the right information at the right time. Training provided in sterile environments of a schoolhouse does little with regards to actual implementation compared to support required during actual deployments and real world operations. Although OJT can be a very effective means of improving skill levels, it is very ineffective if supervisors lack experience necessary to conduct required training.

V. EMPIRICAL STUDY

A. RESEARCH DESIGN AND METHODOLOGY

The empirical study portion includes the use of a quantitative and qualitative approach in an effort to test a hypothesis regarding IT competencies found in a Marine Corps regiment. The goal is to identify IT support problems within a regiment by studying individual perspectives regarding daily operations, user expectations, and training requirements. Focusing on IT capabilities, competencies, and planning conducted in an organization, this portion reviews several issues regarding potential problems with respect to IT support and skills required within the regiment.

1. Quantitative Approach

The questionnaire (Appendix E) focuses on aspects associated with IT standard operating procedures (SOPs), existing IT competencies, IT related functional redundancies, and commercial outsourcing of IT support. This method was used to identify the background and experiences of IT support personnel as well as their understanding of the planning, problem tracking, and reporting necessary in a regimental size organization.

2. Qualitative Approach

Interview questions (Appendix F) attempt to address information regarding unit priorities, daily operations, and IT skill requirements. A qualitative approach to the problem of IT competencies allows for greater insight into the issues of training as well the behaviors and perceptions of IT support personnel. These interview questions lead to

critical information regarding an organization's priorities and day-to-day requirements of IT support.

3. Procedures

The overall strategy centers around the conduct of a cross sectional study focused on the interpretative perception of IT support personnel assigned to a regiment. All data were collected by a single visit to each regiment over a period of four weeks. The process of evaluation occurred in three phases. First, questionnaires were administered to IT support personnel and senior leadership from each regiment. Second, one-on-one interviews were conducted with IT support personnel. Third, information collected was tabulated and analyzed for patterns, trends, areas of interest, and learning points. Prior to administration of surveys, all participants were informed that although answers would be kept confidential, analysis of the data may reveal individual participant's identity.

B. SAMPLE

U. S. Marine Corps Forces Atlantic and Pacific identified each regiment for participation in this study. The sample consists of a regiment from 1st, 2nd, and 3rd Marine Corps divisions. For confidentiality sake, the units involved are labeled regiment A, B, and C. Within each regiment, personnel assigned to the communication section supporting information systems as well as providing leadership and direction were identified. Although significant efforts were made to include all IT support personnel, certain individuals were unable to participate due to other commitments.

A total of 37 survey participants consisted of 2 majors, 2 captains, 1 second lieutenant, 1 master gunnery sergeant, 2 master sergeants, 3 gunnery sergeants, 8 staff sergeants, 3 sergeants, 5 corporals, 8 lance corporals, and 2 privates first class. Involvement from each unit included 9 from regiment A, 18 from regiment B, and 10 from regiment C. The amount of time served in the military ranged from 8 Marines with less than two years to 18 with more than 8. Of the 37 participants, 25 are responsible for performing the daily functions of IT support.

Although each regiment has many similarities, a few differences require explanation. First, even though most units apply standard organizational hierarchies, each regiment used a slightly different reporting structure. Figure 18 illustrates the overall chain of command implemented within the regimental communications section. Second, the area of responsibilities differed regarding the level of IT support provided while in garrison. Two of the units, regiments A and B, were tasked with supporting the entire camp or facilities around their headquarters, subordinate command locations, and Morale, Welfare, and Recreation (MWR) activities. Finally, the most surprising difference is the quality and quantity of personnel assigned to each regiment. The number of IT personnel assigned at the time of this study was 6 for Regiment A, 13 for Regiment B, and 4 for Regiment C.

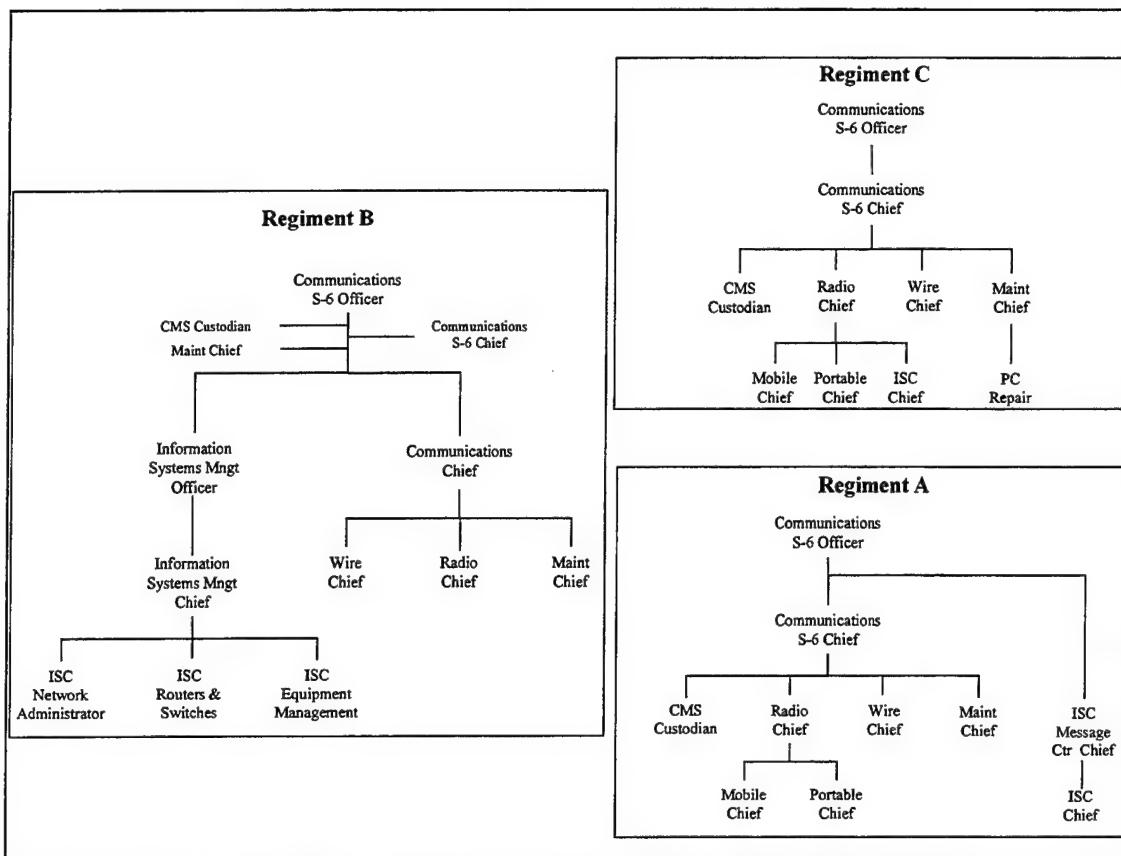


Figure 18: Regimental Communication Section Hierarchy

C. RESULTS AND DISCUSSION

1. Results

Data collected from the questionnaire and interview processes reveal many learning points and discussion topics. Several interesting patterns associated with each regiment, military rank, hours worked, personnel required for assigned tasks, years in service, and occupational specialties were identified. Further, the information collected by observation and informal conversations brought to light other issues. The quantity of personnel assigned to each unit, type of training afforded each Marine, and organizational structure implemented to support functional mission areas are all examples that require

further attention and are discussed later in this section. Individual responses provided by those individuals that completed the survey also are included in Appendix E and interview responses are found in Appendix F.

a. Questionnaire.

Several intriguing aspects are highlighted by the questionnaire such as a distinction in the number of personnel required to support information systems and the hours spent each week in the performance of IT support. Twenty-five of thirty-two respondents suggested that a regiment required eight or more people to support the organization's information systems. This is a significant issue as regiment's only rate three IT support personnel and one PC repairman (T/O 1096F). Number of hours performing the tasks associated with IT support is also important as eighteen respondents reported more than forty hours each week. Although forty hours may not seem substantial, these Marines are also involved in other activities such as morning formations, platoon functions, working parties, and other non-IT related functions. Of the eighteen respondents, ten reported more than fifty hours, and 4 reported more than 60 hours each week supporting IT.

The most surprising outcome from the questionnaire deals with the organizational hierarchy implemented within the communications section. Not only did each regiment establish a different reporting chain, two of the three lacked quality of IT leadership within the section. With the exception of Regiment B, the senior Marine working IT issues was a corporal. Although Regiment A has a staff sergeant 2549

assigned to the section, this individual has not received sufficient training necessary to be effective in the capacity of IT support. An overarching problem associated with this issue is the result of lateral moves from 2542/2549 MOSs to 4066/4068 MOSs. Although personnel reassessments are necessary, associated consequences of reassignment include a lack of training and knowledge of supervisors assigned to the 40XX occupational field.

b. Interview.

The most interesting results obtained from interviews centers on the aspect of retention and training. When asked if they plan on re-enlisting in the Marine Corps at the end of their current contract, 8 individuals responded yes, 10 no, 2 conditional (training related), and 4 not sure. When asked how much training is required to perform your job, 17 began their response with the words "A lot." The general consensus was that a knowledge level equal to a Microsoft Certified Systems Engineer was required to properly support the garrison infrastructure and systems employed at the regiment. Even though Regiment B was the only regiment to complete the NT migration, most individuals recognized training required to properly support garrison requirements as the most critical aspect requiring attention. Additional training needs focused on networks; LAN administration; TCP/IP; routers; systems administration for TCO, IAS, and IOW; and the customer service skills necessary to support operations of a help desk.

When asked if they think Marines at the regimental level receive proper training with respect to IT, every respondent's answer was "no!" Explanations provided include: training is not properly targeted, units are forced to pay for training themselves,

training length is not sufficient, training is not realistic, and the information taught in the schoolhouse is provided in a lab environment but the solutions applied in the real world are quite different. As a result of these deficiencies, one of the divisions has begun their own training program. This program is geared at preparing new Marines for their assignment by focusing on the skills required at the regimental and battalion level. As a result, new Marines remain at the division headquarters receiving up to three months of IT training prior to their assignment to regiment or battalion headquarters. Although these training requirements will demand a greater return on investment, the interview results indicate a willingness to enlist for six years vise four or extend as an acceptable trade-off for the required training.

When asked about the most difficult part of their job, responses varied from "my job is not difficult" to "sometimes I do not know what should be done to fix the problem." Ten of the twenty-four respondents reported that they do not have or receive the proper training and equipment necessary to perform their job. Six individuals identified user's expectations as the most difficult aspect of their work. When asked "Who do you depend on to perform you job?" one Marine tied his answer into the most difficult part of his job by suggesting the best training would be to have someone who is experienced (a staff sergeant or above) work in the ISC section. This person could assist and provide invaluable on-the-job training to the junior Marines.

2. Discussion

a. Quantity and Quality of Personnel.

All regiments are assigned a table of organization (T/O) that identifies the number of personnel and their MOS assignments as well as corresponding grades. The T/O that applies to these organizations is 1096F. This document identifies three 4066 MOSs and one 2818 MOS qualified Marines to support information systems within the organization. Although a regiment's T/O identifies the 4066 (small system specialist) as the occupational specialty responsible for providing IT support, 2542, 2549, 4066, and 4068 Marines are assigned to these billets. Those personnel holding the 2542 and 2549 MOSs are individuals that were originally tasked with the responsibilities of supporting a communications center. These responsibilities include handling unclassified, classified, and special category naval message traffic. Even though the requirement for this task still exists, the process of sending and receiving naval messages is accomplished via automated information systems (yet another system requiring support by IT personnel). In spite of the fact that these Marines are assigned to T/O line numbers for the 4066 MOS, they often are reassigned to organizations that rate a 2542 or 2549 vise the 4066 MOS (as in the case of Sergeant Stedmond from Regiment B), leaving the regiment and similar units without properly trained IT support personnel.

b. Training Afforded to Each Marine.

Several issues were identified regarding the training afforded to Marines, including training locations and eligibility requirements. Although training location

rarely becomes a contentious issue, it appears that centrally provided training is no longer a viable solution for many operating forces. Due to time constraints and existing commitments (operational tempo), several organizations are not able to participate in centrally conducted training. Regiments A and C provided numerous examples of this problem suggesting that mobile training teams or contractor provided training, conducted locally, would better fit their restrictive schedules.

A second cause for concern with respect to training issues centers on aspects of qualification. A recently established program designed to provide necessary skills required for Marine Corps Enterprise Network (MCEN) support has stirred up a conflict regarding eligibility. Standards Branch, T&E Division MCCDC, C4I, Marine Corps Systems Command and the Occupational Field Sponsor, HQMC established three minimum qualifications necessary for the MCEN training. These eligibility criteria include: (1) the individual must be a corporal or above, (2) have two years service obligation remaining after the subject training, and (3) assigned the MOS 40XX or 0602. Applying the alternatives provided for enlistment requirements, competency hierarchy, and promotional opportunities discussed in Chapter IV (establishing an initial enlistment period of six years vise four, provide guaranteed promotion to corporal within two years, and the MOS Competency Model) would most likely resolve the problems of service obligation, rank, and MOS assignment.

c. Functional Mission Area Support.

The most interesting comment received during the study came from the Commanding Officer for Regiment A. When asked to identify the three biggest challenges he faced regarding IT, his response was “personnel (quality and quantity), training (on-the-job and cross training), and the rate at which new equipment is received by the regiment.” The conversation quickly turned toward operational and tactical level differences between higher headquarters organizations such as a Marine Expeditionary Force (MEF) and a division to the battalion. The MEFs and divisions are more operational oriented while the battalion is focused on the tactical aspects of warfare. The MEFs and divisions have used these systems for a few years and have grown accustom to them, while the regiments and battalions have only recently begun to receive, much less employ advanced C4I systems.

The concept of functional mission area support ties directly into the responsibilities required for command and control, intelligence, force protection, fires, maneuver, air support, and logistics. Consider the diagram shown in Chapter II regarding the functional mission areas of a MAGTF (Figure 4). The C4I systems supporting command and control included IAS and IOW for intelligence and force protection, TCO and IOW for fires, maneuver, and air support, MDSS for logistics and UD/MIPS for administration. The commander needs an individual on his staff that can successfully integrate all of the systems supporting command and control. Although it is impractical to think one individual can be a duty expert for all systems, it is very realistic to have that

individual responsible for the integration of all systems as long as duty experts for each application exist within the functional mission areas supporting command and control. Specifically, the S-1 (administration) should be responsible for the system administration and operation of UD/MIPS, the S-2 (intelligence) is responsible for IAS and IOW, the S-3 (operations) provides the expertise for TCO and IOW, and the S-4 (logistics) provides the knowledge and skilled personnel for MDSS. The S-6 (communications) assumes the responsibilities of providing the path (infrastructure, whether it is radio, wire, or wireless), systems integration, and systems assurance for the functional mission areas of command and control C4I systems.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

As the information age provides the world with ability to obtain data nearly instantaneously, the doctrine that provides the military with its visionary guidance and underlying organizational structure has lagged behind. After World War II, the Marine Corps recognized the need for a new way to conduct amphibious landings and changed its doctrine to support the evolutionary requirements of littoral warfare. In recent years, basic works of doctrine supporting command and control remain unchanged despite the challenges resulting from new technologies found in the military. The fielding of C4I systems to operational units has continued with the introduction of networked systems, common tactical picture applications, collaborative planning tools, and video distribution capabilities without modification of the organizational structure or doctrinal publications. Operational units are faced with employing C4I systems in conjunction with "home grown / ad-hoc procedures" in an effort to determine effective concept of operations as well as the underlying IT support requirements. As a result, operational units often find themselves overwhelmed with the challenges of data flow and technology support, adding to the confusion in battle.

In order to implement an IT structure that is capable of creating a means to decrease the "fog of war," it is crucial to construct a solid underlying foundation for the organizational support structure for all IT systems in conjunction with the simultaneous

development of technology. It is not sufficient to simply have information technology without making evolutionary changes in process. In order to afford the commander the ability to reduce the complexities of battle, IT must be timely, reliable, and provide an accurate flow of information. IT will not replace judgment but, with the correct organizational structure and doctrinal foundation, it will provide the ability to improve knowledge thus improve the commander's decision capabilities and extend his view of the battle-space. In the absence of either the correct organization or doctrinal requirements, the IT structure is at best a means of collecting information and at worst, an additive factor in "the fog of war."

Consider a hypothetical training facility for a communications officer designed to produce a core curriculum that integrates technology education evenly across the war-fighting functional areas. Students would end up learning function-specific technology, thus producing a smokestack effect with regard to understanding. Consequently, many students would miss the unifying, vital piece of the IT puzzle: how to think strategically about technology across an organization—an essential skill for the IT managers. Technology skills must not be developed in a stovepipe, they need to be applied across organizations and functions. It is important for IT managers to understand how technology intricately links each function within the organization.

B. RECOMMENDATIONS

Recommendations include: (1) Create a solid underlying foundation for the organizational structure required to support IT systems in conjunction with the

simultaneous development of technology. This foundation must include the responsibilities of infrastructure, systems integration, and systems assurance. These responsibilities should be assigned to the Communications Officer with supporting roles assigned to each functional mission area representative. (2) Modify existing IT related MOS structure addressing the areas of infrastructure, functional application, and systems assurance. Although training requirements will demand a greater return on investment, the quantitative and qualitative results from this study indicate a willingness to enlist for six years vise four, or extend as an acceptable trade-off for training. (3) Modify the Training Development System (TDS) by focusing on a multi-phase instructional process. Provide mobile training teams designed to teach the core and core plus skills as well as the concept of operation for C4I systems employed by the units.

C. SUGGESTED FURTHER STUDIES

Co-evolution of technology with the supporting organization and doctrinal requirements is a key area that requires additional study. Although steps have been taken that appear to address this concept, they lack required depth and timeliness necessary to achieve the objective of maximizing IT capabilities. Both the basic organizational structure and the core doctrine of the Marine Corps needs to be reviewed to ensure that the evolution of requirements necessary for training support personnel meets the needs established by the implementation of current and proposed IT systems. For example, the Copernicus doctrine was developed to be the Naval Command and Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance vision in

support of Joint and Naval war fighting strategies. Although it provides the guidance to enable the Navy-Marine Corps team to meet the demands of the new strategic environment while integrating emerging operational concepts and evolving information technologies, its focus is on hardware, software, and systems integration. It does not adequately address the spectrum of IT skills required to support the infrastructure of specific C4I systems.

Additionally, consideration should be given to the implementation of a “report card process.” This report card should provide a method for identifying problems associated with systems fielded to the operating forces. The organization should work for and report directly to the operating forces Commanders. One such method is currently in place for the Navy and is known as the Battle Group/Amphibious Ready Group C4I Systems Integration Testing (BGSIT). This process was initiated by the Type Commanders designed to identify Battle Group Combat/C4I system areas of concern, determine level and sources of technical expertise, and coordinate total systems integration testing in an operational environment [Ref. 3]. A BGSIT like process would allow Operating Force Commanders the flexibility necessary to validate quality assurance by systematically determining problems as well as problem resolution.

APPENDIX A. TACTICAL COMBAT OPERATIONS (TCO) SYSTEM¹



1. Applying step I.2 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the recommended Select Tasks / Functions for the TCO system.

<u>Task ID</u>	<u>Task Description</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
TCO 1.1	Organize equipment for LAN/EUCE system operations
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
TCO 2.1	Plan power distribution and grounding requirements
TCO 2.2	Implement power distribution and grounding requirements
TCO 2.3	Perform limited technical inspection (LTI)
TCO 2.4	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation
TCO 2.5	Implement electromagnetic environmental effects E(3) program.
TCO 2.6	Plan for deployed maintenance support

¹ This information was compiled from the following sources: References 3, 18, 19, and 20.

<u>Task ID</u>	<u>Task Description</u>
TCO 2.7	Plan for deployment/redeployment EUCE
TCO 2.8	Assist end users in deployment preparation
TCO 2.9	Use MIMMS/SASSY reports and forms
TCO 2.10	Maintain Marine Corps authorized operating systems and common user software
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM (UNIX OPERATING SYSTEM)
TCO 3.1	Configure initial hardware set-up and cabling procedures
TCO 3.2	Configure system administration set-up
TCO 3.3	Configure software installation
TCO 3.4	Install HP UNIX operating system
TCO 3.5	Operate a workstation using HP UNIX operating system
TCO 3.6	Connect a UNIX platform to a network
TCO 3.7	Perform communication setup procedures
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
TCO 4.1	Configure and conduct network administration
TCO 4.2	Configure system communications
TCO 4.3	Design a Local Area Network
TCO 4.4	Develop an IP network architecture
TCO 4.5	Develop a multi-protocol network plan

<u>Task ID</u>	<u>Task Description</u>
TCO 4.6	Manage network services
TCO 4.7	Perform networking troubleshooting techniques
TCO 4.8	Configure Router hardware
TCO 4.9	Configure Router software
DUTY AREA 5 SYSTEM	APPLICATION AND DATABASE MANAGEMENT
TCO 5.1	Configure track database management system
DUTY AREA 6	SYSTEM ASSURANCE
TCO 6.1	Perform security manager functions
TCO 6.2	Manage network security

2. Applying steps I.2 and I.3 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the recommended Select Tasks / Functions and Construct Job Performance Measures for the TCO system.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
TCO 1.1	Organize equipment for LAN/EUCE system operations <ul style="list-style-type: none">- Determine EUCE requirements- Examine the CMR for equipment accountability- Examine equipment record (ERO) log and temp loan records for equipment availability- Examine orders or directives for equipment requirements- Report Type I and Type II deficiencies
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
TCO 2.1	Plan power distribution and grounding requirements <ul style="list-style-type: none">- Review EDL for power requirements- Plan requirements with electrical engineers- Plan proper EUCE grounding/protection.
TCO 2.2	Implement power distribution and grounding requirements <ul style="list-style-type: none">- Review EDL for power requirements- Coordinate power requirements with unit engineers- Ensure all EUCE is properly grounded- Test power and grounding daily- Ensure user compliance with power and grounding requirements
TCO 2.3	Perform limited technical inspection (LTI) <ul style="list-style-type: none">- Determine requirements of the LTI- Develop an LTI checklist- Conduct LTI- Complete the checklist- Document results in EUCE record jacket.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TCO 2.4	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation <ul style="list-style-type: none"> - Review references - Identify materials requiring ESD protection - Perform actions necessary to protect ESD sensitive materials
TCO 2.5	Implement electromagnetic environmental effects E(3) program <ul style="list-style-type: none"> - Develop design and installation techniques that cover the following areas: <ul style="list-style-type: none"> a. Indirect coupling b. Shielding c. Grounding d. Bonding e. Filtering f. Corrosion control - Develop maintenance standards - Identify and report E3 problems to the unit E3 coordinator.
TCO 2.6	Plan for deployed maintenance support <ul style="list-style-type: none"> - Implement unit EUCE Equipment Density List (EDL) for deployment - Implement unit EUCE EDL checklists for end users - Implement Pre-Expedited Bin (PEB) for unit deployment resources - Coordinate with embark personnel to establish EUCE lift requirements
TCO 2.7	Plan deployment/redeployment EUCE <ul style="list-style-type: none"> - Examine deployment orders/instructions and unit EUCE Equipment Density List (EDL) - Determine equipment requirements - Determine/coordinate with embarkation personnel, special lifting/handling requirements for EUCE - Determine special security requirements for maintenance/maintenance support equipment - Develop instructions for deployment.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TCO 2.8	Assist end users in deployment preparation <ul style="list-style-type: none"> - Implement unit deployment requirements for EUCE - Implement site specific pre-deployment checklists - Provide technical assistance to end users - Provide pre-deployment checklists to end users
TCO 2.9	Use MIMMS/SASSY reports and forms <ul style="list-style-type: none"> - Complete Equipment Repair Order (ERO) and ERO Shopping List (EROSL) - Coordinate with MIMMS/SASSY personnel on DPR and LM2 reports - File the ERO in EUCE record jacket
TCO 2.10	Maintain Marine Corps authorized operating systems and common user software <ul style="list-style-type: none"> - Identify updates provided by vendors for all software - Apply software updates as required - Call appropriate vendor for assistance as necessary - Perform quality control - Ensure compliance with licensing agreements - Document results in EUCE record jacket
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM (UNIX OPERATING SYSTEM)
TCO 3.1	Configure initial hardware set-up and cabling procedures <ul style="list-style-type: none"> - Configure and connect the HP9000/712 CPU - Configure and connect UPS - Configure and connect the color monitor - Connect the keyboard and mouse - Configure and connect the printer - Configure and connect the Hard Disk Drives (HDD) - Configure and connect the 4mm DAT tape drive - Configure and connect the CD-ROM drive - Conduct power-up procedures - Conduct shutdown procedures

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TCO 3.2	Configure system administration set-up <ul style="list-style-type: none"> - Conduct system administration initialization - Manipulate system administration menus - Manipulate the hardware menus - Manipulate the software menus - Manipulate the database menus - Manipulate the network menus - Manipulate the comms menus
TCO 3.3	Configure software installation <ul style="list-style-type: none"> - Manipulate the JMCIS installer - Manipulate the installation server (4mm DAT) - Configure and archive net server data - Load the application software - Load appropriate software patches
TCO 3.4	Install HP UNIX operating system <ul style="list-style-type: none"> - Determine users system configuration requirements - Boot the system using UNIX release media - Initialize UNIX configuration files - Configure the workstation for users - Verify operating environment log files.
TCO 3.5	Operate a workstation using HP UNIX operating system <ul style="list-style-type: none"> - Conduct system start-up/shutdown - Log-in to the workstation - Change password - Edit a file using the vi editor - Invoke input/output redirection - Log-out of the workstation - Manipulate HP UNIX file utilities - Manipulate HP UNIX display utilities - Manipulate HP UNIX print utilities - Manipulate HP UNIX X Windows utilities - Manipulate HP UNIX communication utilities - Manipulate HP UNIX diagnostic utilities

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TCO 3.6	Connect a UNIX platform to a network <ul style="list-style-type: none"> - Determine type of connection - Manipulate HP-UNIX networking commands - Physically connect the HP-UNIX platform - Configure communications interface - Verify connectivity - Modify routing tables - Verify routes
TCO 3.7	Perform communication setup procedures <ul style="list-style-type: none"> - Identify communication channel requirements - Establish STU-III Secure communications connectivity - Establish KY-68 Secure communications connectivity - Establish radio configuration using the TCIM - Establish telephone configuration using the TCIM - Establish point-to-point configuration using the TCIM
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
TCO 4.1	Configure and conduct network administration <ul style="list-style-type: none"> - Configure machine ID - Configure system date-time-group (DTG)
TCO 4.2	Configure system communications <ul style="list-style-type: none"> - Configure the WAN unique identification (UID) - Configure the data defense network (DDN) timeout - Configure the DDN host table - Configure the intelligence processing system (NIPS) - Configure the tactical data management (TDBM) host - Configure the system for remote users

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TCO 4.3	Design a Local Area Network <ul style="list-style-type: none"> - Examine communications architecture and paths - Examine data security requirements - Examine physical security requirements - Examine available bandwidth - Examine client/server workstations to be connected - Determine IP addressing requirements - Develop network contingency plan - Develop a logical network map
TCO 4.4	Develop an IP network architecture <ul style="list-style-type: none"> - Review data communication architecture - Identify IP clients - Identify number of IP networks required - Establish sub-netting scheme - Assign IP addresses - Create a logical network diagram
TCO 4.5	Develop a multi-protocol network plan <ul style="list-style-type: none"> - Identify protocols on current network - Research protocol characteristics - Identify interoperability difficulties - Establish network plan
TCO 4.6	Manage network services <ul style="list-style-type: none"> - Define network file system (NFS) terminology - Export file hierarchies with NFS - Mount file hierarchies with NFS - Create NFS auto-mounter maps - Define network information service (NIS) terminology - Configure a NIS domain - Configure the UNIX to UNIX copy program (UUCP) - Use UUCP to copy files to/from a remote host

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TCO 4.7	Perform networking troubleshooting techniques <ul style="list-style-type: none"> - Identify possible problems - Analyze problems - Hypothesize possible solutions - Validate possible solutions - Implement solutions - Verify resolution - Document procedures
TCO 4.8	Configure Router hardware <ul style="list-style-type: none"> - Identify required internal components - Identify required external peripheral components - Identify available hardware options - Install internal components - Install external components
TCO 4.9	Configure Router software <ul style="list-style-type: none"> - Identify network protocols - Identify installed hardware - Configure software
DUTY AREA 5	APPLICATION AND DATABASE MANAGEMENT SYSTEM
TCO 5.1	Configure track database management system <ul style="list-style-type: none"> - Configure and archive JMCIS data - Restore JMCIS data - Clean data files
DUTY AREA 6	SYSTEM ASSURANCE
TCO 6.1	Perform security manager functions <ul style="list-style-type: none"> - Configure security manager account - Create and modify a role - Create and monitor user accounts - Perform password maintenance - Create and monitor system accounts

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
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TCO 6.2	
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	Manage network security
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| | <ul style="list-style-type: none">- Analyze current network security procedures- Recommend solutions to identified vulnerabilities- Implement corrections to secure network |
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APPENDIX B. INTELLIGENCE ANALYSIS SYSTEM (IAS)²



1. Applying step I.2 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the recommended Select Tasks / Functions for the IAS.

<u>Task ID</u>	<u>Task Description</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
IAS 1.1	Organize equipment for LAN/EUCE system operations
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
IAS 2.1	Plan power distribution and grounding requirements
IAS 2.2	Implement power distribution and grounding requirements
IAS 2.3	Perform limited technical inspection (LTI)
IAS 2.4	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation
IAS 2.5	Implement electromagnetic environmental effects E(3) program.

² This information was compiled from the following sources: References 3, 16, and 19.

<u>Task ID</u>	<u>Task Description</u>
IAS 2.6	Plan for deployed maintenance support
IAS 2.7	Plan for deployment/redeployment EUCE
IAS 2.8	Assist end users in deployment preparation
IAS 2.9	Use MIMMS/SASSY reports and forms
IAS 2.10	Maintain Marine Corps authorized operating systems and common user software
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM (UNIX OPERATING SYSTEM)
IAS 3.1	Configure initial hardware set-up and cabling procedures
IAS 3.2	Configure system administration set-up
IAS 3.3	Configure software installation
IAS 3.4	Install HP UNIX operating system
IAS 3.5	Operate a workstation using HP UNIX operating system
IAS 3.6	Connect a UNIX platform to a network
IAS 3.7	Perform communication setup procedures
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANs)
IAS 4.1	Configure and conduct network administration
IAS 4.2	Configure system communications
IAS 4.3	Design a Local Area Network
IAS 4.4	Develop an IP network architecture

<u>Task ID</u>	<u>Task Description</u>
IAS 4.5	Develop a multi-protocol network plan
IAS 4.6	Manage network services
IAS 4.7	Perform networking troubleshooting techniques
IAS 4.8	Configure Router hardware
IAS 4.9	Configure Router software
DUTY AREA 5	APPLICATION AND DATABASE MANAGEMENT SYSTEM
IAS 5.1	Configure track database management system
DUTY AREA 6	SYSTEM ASSURANCE
IAS 6.1	Perform security manager functions
IAS 6.2	Manage network security

2. Applying steps I.2 and I.3 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the Select Tasks / Functions and Construct Job Performance Measures for the IAS.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
IAS 1.1	Organize equipment for LAN/EUCE system operations <ul style="list-style-type: none">- Determine EUCE requirements- Examine the CMR for equipment accountability- Examine equipment record (ERO) log and temp loan records for equipment availability- Examine orders or directives for equipment requirements- Report Type I and Type II deficiencies
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
IAS 2.1	Plan power distribution and grounding requirements <ul style="list-style-type: none">- Review EDL for power requirements- Plan requirements with electrical engineers- Plan proper EUCE grounding/protection.
IAS 2.2	Implement power distribution and grounding requirements <ul style="list-style-type: none">- Review EDL for power requirements- Coordinate power requirements with unit engineers- Ensure all EUCE is properly grounded- Test power and grounding daily- Ensure user compliance with power and grounding requirements
IAS 2.3	Perform limited technical inspection (LTI) <ul style="list-style-type: none">- Determine requirements of the LTI- Develop an LTI checklist- Conduct LTI- Complete the checklist- Document results in EUCE record jacket.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 2.4	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation <ul style="list-style-type: none"> - Review references - Identify materials requiring ESD protection - Perform actions necessary to protect ESD sensitive materials
IAS 2.5 program	Implement electromagnetic environmental effects E(3) <ul style="list-style-type: none"> - Develop design and installation techniques that cover the following areas: <ul style="list-style-type: none"> b. Indirect coupling b. Shielding c. Grounding d. Bonding e. Filtering f. Corrosion control - Develop maintenance standards - Identify and report E3 problems to the unit E3 coordinator.
IAS 2.6	Plan for deployed maintenance support <ul style="list-style-type: none"> - Implement unit EUCE Equipment Density List (EDL) for deployment - Implement unit EUCE EDL checklists for end users - Implement Pre-Expedited Bin (PEB) for unit deployment resources - Coordinate with embark personnel to establish EUCE lift requirements
IAS 2.7	Plan deployment/redeployment EUCE <ul style="list-style-type: none"> - Examine deployment orders/instructions and unit EUCE Equipment Density List (EDL) - Determine equipment requirements - Determine/coordinate with embarkation personnel, special lifting/handling requirements for EUCE - Determine special security requirements for maintenance/maintenance support equipment - Develop instructions for deployment.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 2.8	Assist end users in deployment preparation <ul style="list-style-type: none"> - Implement unit deployment requirements for EUCE - Implement site specific pre-deployment checklists - Provide technical assistance to end users - Provide pre-deployment checklists to end users
IAS 2.9	Use MIMMS/SASSY reports and forms <ul style="list-style-type: none"> - Complete Equipment Repair Order (ERO) and ERO Shopping List (EROSL) - Coordinate with MIMMS/SASSY personnel on DPR and LM2 reports - File the ERO in EUCE record jacket
IAS 2.10	Maintain Marine Corps authorized operating systems and common user software <ul style="list-style-type: none"> - Identify updates provided by vendors for all software - Apply software updates as required - Call appropriate vendor for assistance as necessary - Perform quality control - Ensure compliance with licensing agreements - Document results in EUCE record jacket
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM (UNIX OPERATING SYSTEM)
IAS 3.1	Configure initial hardware set-up and cabling procedures <ul style="list-style-type: none"> - Configure and connect the HP9000/712 CPU - Configure and connect UPS - Configure and connect the color monitor - Connect the keyboard and mouse - Configure and connect the printer - Configure and connect the Hard Disk Drives (HDD) - Configure and connect the 4mm DAT tape drive - Configure and connect the CD-ROM drive - Conduct power-up procedures - Conduct shutdown procedures

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 3.2	Configure system administration set-up <ul style="list-style-type: none"> - Conduct system administration initialization - Manipulate system administration menus - Manipulate the hardware menus - Manipulate the software menus - Manipulate the database menus - Manipulate the network menus - Manipulate the comms menus
IAS 3.3	Configure software installation <ul style="list-style-type: none"> - Manipulate the JMCIS installer - Manipulate the installation server (4mm DAT) - Configure and archive net server data - Load the application software - Load appropriate software patches
IAS 3.4	Install HP UNIX operating system <ul style="list-style-type: none"> - Determine users system configuration requirements - Boot the system using UNIX release media - Initialize UNIX configuration files - Configure the workstation for users - Verify operating environment log files.
IAS 3.5	Operate a workstation using HP UNIX operating system <ul style="list-style-type: none"> - Conduct system start-up/shutdown - Log-in to the workstation - Change password - Edit a file using the vi editor - Invoke input/output redirection - Log-out of the workstation - Manipulate HP UNIX file utilities - Manipulate HP UNIX display utilities - Manipulate HP UNIX print utilities - Manipulate HP UNIX X Windows utilities - Manipulate HP UNIX communication utilities - Manipulate HP UNIX diagnostic utilities

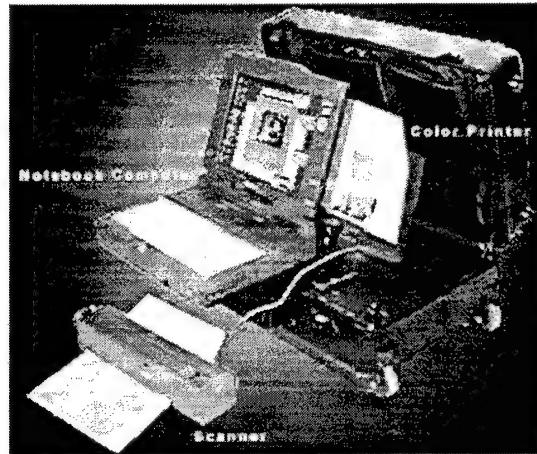
<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 3.6	Connect a UNIX platform to a network <ul style="list-style-type: none"> - Determine type of connection - Manipulate HP-UNIX networking commands - Physically connect the HP-UNIX platform - Configure communications interface - Verify connectivity - Modify routing tables - Verify routes
IAS 3.7	Perform communication setup procedures <ul style="list-style-type: none"> - Identify communication channel requirements - Establish STU-III Secure communications connectivity - Establish KY-68 Secure communications connectivity - Establish radio configuration using the TCIM - Establish telephone configuration using the TCIM - Establish point-to-point configuration using the TCIM
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
IAS 4.1	Configure and conduct network administration <ul style="list-style-type: none"> - Configure machine ID - Configure system date-time-group (DTG)
IAS 4.2	Configure system communications <ul style="list-style-type: none"> - Configure the WAN unique identification (UID) - Configure the data defense network (DDN) timeout - Configure the DDN host table - Configure the intelligence processing system (NIPS) - Configure the tactical data management (TDBM) host - Configure the system for remote users

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 4.3	<p>Design a Local Area Network</p> <ul style="list-style-type: none"> - Examine communications architecture and paths - Examine data security requirements - Examine physical security requirements - Examine available bandwidth - Examine client/server workstations to be connected - Determine IP addressing requirements - Develop network contingency plan - Develop a logical network map
IAS 4.4	<p>Develop an IP network architecture</p> <ul style="list-style-type: none"> - Review data communication architecture - Identify IP clients - Identify number of IP networks required - Establish sub-netting scheme - Assign IP addresses - Create a logical network diagram
IAS 4.5	<p>Develop a multi-protocol network plan</p> <ul style="list-style-type: none"> - Identify protocols on current network - Research protocol characteristics - Identify interoperability difficulties - Establish network plan
IAS 4.6	<p>Manage network services</p> <ul style="list-style-type: none"> - Define network file system (NFS) terminology - Export file hierarchies with NFS - Mount file hierarchies with NFS - Create NFS auto-mounter maps - Define network information service (NIS) terminology - Configure a NIS domain - Configure the UNIX to UNIX copy program (UUCP) - Use UUCP to copy files to/from a remote host

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 4.7	Perform networking troubleshooting techniques <ul style="list-style-type: none"> - Identify possible problems - Analyze problems - Hypothesize possible solutions - Validate possible solutions - Implement solutions - Verify resolution - Document procedures
IAS 4.8	Configure Router hardware <ul style="list-style-type: none"> - Identify required internal components - Identify required external peripheral components - Identify available hardware options - Install internal components - Install external components
IAS 4.9	Configure Router software <ul style="list-style-type: none"> - Identify network protocols - Identify installed hardware - Configure software
DUTY AREA 5	APPLICATION AND DATABASE MANAGEMENT SYSTEM
IAS 5.1	Configure track database management system <ul style="list-style-type: none"> - Configure and archive JMCIS data - Restore JMCIS data - Clean data files
DUTY AREA 6	SYSTEM ASSURANCE
IAS 6.1	Perform security manager functions <ul style="list-style-type: none"> - Configure security manager account - Create and modify a role - Create and monitor user accounts - Perform password maintenance - Create and monitor system accounts

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IAS 6.2	Manage network security <ul style="list-style-type: none">- Analyze current network security procedures- Recommend solutions to identified vulnerabilities- Implement corrections to secure network

APPENDIX C. INTELLIGENCE OPERATIONS WORKSTATION (IOW)³



1. Applying step I.2 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the Select Tasks / Functions for the IOW.

<u>Task ID</u>	<u>Task Description</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
IOW 1.1	Organize equipment for LAN/EUCE system operations
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
IOW 2.1	Perform limited technical inspection (LTI)
IOW 2.2	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation
IOW 2.3	Plan for deployed maintenance support
IOW 2.4	Plan for deployment/redeployment EUCE
IOW 2.5	Assist end users in deployment preparation

³ This information was compiled from the references: 3 and 17.

<u>Task ID</u>	<u>Task Description</u>
IOW 2.6	Use MIMMS/SASSY reports and forms
IOW 2.7	Maintain Marine Corps authorized operating systems and common user software
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM
IOW 3.1	Configure initial hardware set-up and cabling procedures
IOW 3.2	Configure system administration set-up
IOW 3.3	Configure software installation
IOW 3.4	Install Windows NT operating system (OS)
IOW 3.5	Install Microsoft Exchange Server software
IOW 3.6	Install Microsoft Internet Information Server software
IOW 3.7	Install Command and Control Personnel Computer (C2PC) software (Gateway and Client)
IOW 3.8	Install the Joint Message Handling System (JMHS)
IOW 3.9	Install the Digital Product Server (DPS) software
IOW 3.10	Install the Visual Access Dissemination and Intelligence Report (VADIR) software
IOW 3.11	Operate the workstation using the Windows NT Server 4.0 OS
IOW 3.12	Configure Microsoft Exchange Server and Clients
IOW 3.13	Configure Microsoft Internet Information Server and Clients
IOW 3.14	Configure the Joint Message Handling System (JMHS)
IOW 3.15	Configure the Digital Product Server (DPS) software

<u>Task ID</u>	<u>Task Description</u>
IOW 3.16	Configure the Visual Access Dissemination and Intelligence Report (VADIR) software
IOW 3.17	Perform communications setup procedures
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
IOW 4.1	Connect IOW workstation to a network
IOW 4.2	Configure and conduct network administration
IOW 4.3	Configure system communications
IOW 4.4	Design a LAN
IOW 4.5	Develop an IP network architecture
IOW 4.6	Develop a multi-protocol network plan
IOW 4.7	Manage network services
IOW 4.8	Perform network troubleshooting techniques
DUTY AREA 5	APPLICATION AND DATABASE MANAGEMENT SYSTEM
IOW 5.1	Configure track database management system
DUTY AREA 6	SYSTEM ASSURANCE
IOW 6.1	Perform security manager functions
IOW 6.2	Manage network security

2. Applying steps I.2 and I.3 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the recommended Select Tasks / Functions and Construct Job Performance Measures for IOW.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
IOW 1.1	<p>Organize equipment for LAN/EUCE system operations</p> <ul style="list-style-type: none">- Determine EUCE requirements- Examine the CMR for equipment accountability- Examine equipment record (ERO) log and temp loan records for equipment availability- Examine orders or directives for equipment requirements- Report Type I and Type II deficiencies
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
IOW 2.1	<p>Perform limited technical inspection (LTI)</p> <ul style="list-style-type: none">- Determine requirements of the LTI- Develop an LTI checklist- Conduct LTI- Complete the checklist- Document results in EUCE record jacket.
IOW 2.2	<p>Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation</p> <ul style="list-style-type: none">- Review references- Identify materials requiring ESD protection- Perform actions necessary to protect ESD sensitive materials
IOW 2.3	<p>Plan for deployed maintenance support</p> <ul style="list-style-type: none">- Implement unit EUCE Equipment Density List (EDL) for deployment- Implement unit EUCE EDL checklists for end users- Implement Pre-Expended Bin (PEB) for unit deployment resources- Coordinate with embark personnel to establish EUCE lift requirements

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IOW 2.4	Plan for deployment/redeployment EUCE <ul style="list-style-type: none"> - Examine deployment orders/instructions and unit EUCE Equipment Density List (EDL) - Determine equipment requirements - Determine/coordinate with embarkation personnel, special lifting/handling requirements for EUCE - Determine special security requirements for maintenance/maintenance support equipment - Develop instructions for deployment.
IOW 2.5	Assist end users in deployment preparation <ul style="list-style-type: none"> - Implement unit deployment requirements for EUCE - Implement site specific pre-deployment checklists - Provide technical assistance to end users - Provide pre-deployment checklists to end users
IOW 2.6	Use MIMMS/SASSY reports and forms <ul style="list-style-type: none"> - Complete Equipment Repair Order (ERO) and ERO Shopping List (EROSL) - Coordinate with MIMMS/SASSY personnel on DPR and LM2 reports - File the ERO in EUCE record jacket
IOW 2.7	Maintain Marine Corps authorized operating systems and common user software <ul style="list-style-type: none"> - Identify updates provided by vendors for all software - Apply software updates as required - Call appropriate vendor for assistance as necessary - Perform quality control - Ensure compliance with licensing agreements - Document results in EUCE record jacket

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM (UNIX OPERATING SYSTEM)
IOW 3.1	<p>Configure initial hardware set-up and cabling procedures</p> <ul style="list-style-type: none"> - Configure and connect the IBM ThinkPad 770 laptop - Configure and connect the NEC 2000 LCD Monitor - Configure and connect the peripheral equipment - Configure and connect the appropriate printer - Configure and connect the Toshiba TLP-511 LSD - Configure and connect the DC-AC power inverter - Conduct power-up/shutdown procedures
IOW 3.2	<p>Configure system administration set-up</p> <ul style="list-style-type: none"> - Determine system administration requirements - Configure Windows NT Server 4.0 software - Configure C2PC software - Install appropriate common user software - Configure appropriate common user software - Ensure compliance with licensing agreements - Document software setup in EUCE record jacket - Provide user assistance and training as required
IOW 3.3	<p>Configure software installation</p> <ul style="list-style-type: none"> - Determine user system configuration requirements - Configure C2PC Gateway installation - Configure C2PC client installation - Load authorized application software - Load appropriate software patches
IOW 3.4	<p>Install Windows NT operating system (OS)</p> <ul style="list-style-type: none"> - Install Windows NT and NT server 4.0 - Create system administration and user accounts - Configure NT server administration - Configure the NT server for network connectivity - Install appropriate drivers for all peripherals

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IOW 3.5	Install Microsoft Exchange Server software <ul style="list-style-type: none"> - Install Microsoft Exchange Server - Create system administration and user accounts - Configure Microsoft Exchange server administration - Configure Microsoft Exchange for the enterprise - Install appropriate drivers
IOW 3.6	Install Microsoft Internet Information Server software <ul style="list-style-type: none"> - Install Microsoft Internet Information Server (IIS) - Configure Microsoft IIS administration
IOW 3.7	Install Command and Control Personnel Computer (C2PC) software (Gateway and Client) <ul style="list-style-type: none"> - Install C2PC Gateway or Client software - Configure the C2PC Gateway TCP-UDP port number - Configure the JMCIS/GCCS TDBM TCP-UDP host IP - Configure the TDBM TCP-UDP port number - Install and configure for the Unified Build (UB) version - Configure IP address - Configure the Subnet Mask
IOW 3.8	Install the Joint Message Handling System (JMHS) <ul style="list-style-type: none"> - Install the JMHS - Establish link for incoming message traffic
IOW 3.9	Install the Digital Product Server (DPS) software <ul style="list-style-type: none"> - Install DPS software
IOW 3.10	Install the Visual Access Dissemination and Intelligence Report (VADIR) software <ul style="list-style-type: none"> - Install VADIR software - Configure VADIR
IOW 3.11	Operate the workstation using the Windows NT Server 4.0 OS <ul style="list-style-type: none"> - Conduct system start-up/shutdown - Log-in to the workstation - Change password

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IOW 3.12	Configure Microsoft Exchange Server and Clients <ul style="list-style-type: none"> - Identify naming standards for Exchange users mailbox - Configure user mailboxes - Configure distribution lists - Configure phone lists - Configure E-mail addresses - Configure mailbox limits - Configure organizational mailboxes
IOW 3.13	Configure Microsoft Internet Information Server and Clients <ul style="list-style-type: none"> - Configure Microsoft IIS Administration Accounts - Configure Microsoft IIS User Accounts
IOW 3.14	Configure the Joint Message Handling System (JMHS) <ul style="list-style-type: none"> - Configure JMHS Administration Accounts - Configure JMHS user accounts
IOW 3.15	Configure the Digital Product Server (DPS) software <ul style="list-style-type: none"> - Configure DPS Administration Accounts - Configure DPS User Accounts
IOW 3.16	Configure the Visual Access Dissemination and Intelligence Report (VADIR) software <ul style="list-style-type: none"> - Configure VADIR Administration Accounts - Configure VADR User Accounts
IOW 3.17	Perform communications setup procedures <ul style="list-style-type: none"> - Identify communication channel requirements - Configure the tactical data management (TDBM) - Conduct appropriate communications setup

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
IOW 4.1	<p>Connect IOW workstation to a network</p> <ul style="list-style-type: none"> - Determine type of connection - Manipulate networking commands - Physically connect the workstation - Configure communications interface - Verify connectivity - Modify routing tables - Verify routes
IOW 4.2	<p>Configure and conduct network administration</p> <ul style="list-style-type: none"> - Configure machine ID - Configure system date-time-group (DTG)
IOW 4.3	<p>Configure system communications</p> <ul style="list-style-type: none"> - Configure the WAN unique identification (UID) - Configure the system for remote users (RAS)
IOW 4.4	<p>Design a LAN</p> <ul style="list-style-type: none"> - Examine communications architecture and paths - Examine data security requirements - Examine physical security requirements - Examine available bandwidth - Examine client/server workstations to be connected - Determine IP addressing requirements - Develop network contingency plan - Develop a logical network map
IOW 4.5	<p>Develop an IP network architecture</p> <ul style="list-style-type: none"> - Review data communications architecture - Identify IP clients - Identify number of IP networks required - Identify Dynamic Host Configuration Protocol capabilities - Establish sub-netting scheme - Assign IP address - Create a logical network diagram

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
IOW 4.6	Develop a multi-protocol network plan <ul style="list-style-type: none"> - Identify protocols on current network - Research protocol characteristics - Identify interoperability difficulties - Establish network plan
IOW 4.7	Manage network services <ul style="list-style-type: none"> - Define network file system terminology (NTFS/FAT) - Export file hierarchies with NFS - Mount file hierarchies with NFS - Create NFS backup procedures (RAID Level) - Configure network management support tools
IOW 4.8	Perform network troubleshooting techniques <ul style="list-style-type: none"> - Identify possible problems - Analyze problems - Hypothesize possible solutions - Validate possible solutions - Implement solutions - Verify resolution - Document procedures
DUTY AREA 5 SYSTEM	APPLICATION AND DATABASE MANAGEMENT
IOW 5.1	Configure track database management system <ul style="list-style-type: none"> - Configure and archive JMCIS data - Restore JMCIS data - Clean data files
DUTY AREA 6	SYSTEM ASSURANCE
IOW 6.1	Perform security manager functions <ul style="list-style-type: none"> - Configure security manager account - Create and modify a role - Create and monitor user accounts - Perform password maintenance - Create and monitor system accounts

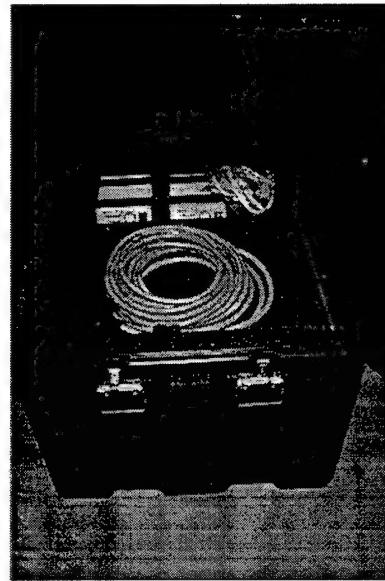
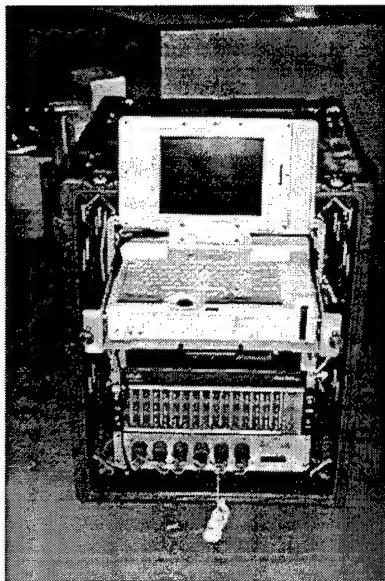
<u>Task ID</u>	<u>Task Description & Performance Measures</u>
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IOW 6.2	
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	Manage network security
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|--|---|
| | <ul style="list-style-type: none">- Analyze current network security procedures- Recommend solutions to identify vulnerabilities- Implement corrections to secure network |
|--|---|

APPENDIX D. TACTICAL DATA NETWORK (TDN)⁴



1. Applying step I.2 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the Select Tasks / Functions for the TDN.

<u>Task ID</u>	<u>Task Description</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
TDN 1.1	Organize equipment for LAN/EUCE system operations
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
TDN 2.1	Plan power distribution and grounding requirements
TDN 2.2	Implement power distribution and grounding requirements
TDN 2.3	Perform limited technical inspection (LTI)
TDN 2.4	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation
TDN 2.5	Implement electromagnetic environmental effects E(3) program

⁴ This information was compiled from references: 1 and 3.

<u>Task ID</u>	<u>Task Description</u>
TDN 2.6	Plan for deployed maintenance support
TDN 2.7	Plan deployment/redeployment EUCE
TDN 2.8	Assist end users in deployment preparation
TDN 2.9	Use MIMMS/SASSY reports and forms
TDN 2.10	Maintain Marine Corps authorized operating systems and common user software
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM
TDN 3.1	Install EUCE Hardware
TDN 3.2	Install and configure an EUCE operating system and Marine Corps authorized common user software
TDN 3.3	Create a network server
TDN 3.4	Troubleshoot EUCE
TDN 3.5	Maintain EUCE
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
TDN 4.1	Plan local area networks
TDN 4.2	Install a Local Area Network
TDN 4.3	Maintain a Local Area Network
TDN 4.4	Manage a Local Area Network
TDN 4.5	Direct installation of a local area network
TDN 4.6	Plan a wide area network

<u>Task ID</u>	<u>Task Description</u>
TDN 4.7	Install a Wide Area Network
TDN 4.8	Maintain a Wide Area Network
TDN 4.9	Manage a Wide Area Network
TDN 4.10	Direct installation of a Wide Area Network
TDN 4.11	Install a Network Node
TDN 4.12	Implement Network Services
TDN 4.13	Supervise operation of a network operation / information center
DUTY AREA 5	APPLICATION AND DATABASE MANAGEMENT SYSTEM
DUTY AREA 6	SYSTEM ASSURANCE
TDN 6.1	Implement ADP/Data communications security measures
TDN 6.2	Coordinate communications material security system (CMS) support
TDN 6.3	Employ CRYPTO Equipment

2. Applying steps I.2 and I.3 of the Inter-service Procedures for Instructional Systems Development (IPISD) Model yields the recommended Select Tasks / Functions and Construct Job Performance Measures for TDN.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 1	RESOURCE MANAGEMENT AND ADMINISTRATION
TDN 1.1	Organize equipment for LAN/EUCE system operations <ul style="list-style-type: none">- Determine EUCE requirements- Examine the CMR for equipment accountability- Examine equipment record (ERO) log and temp loan records for equipment availability- Examine orders or directives for equipment requirements- Report Type I and Type II deficiencies
DUTY AREA 2	DATA COMMUNICATIONS SUPPORT
TDN 2.1	Plan power distribution and grounding requirements <ul style="list-style-type: none">- Review EDL for power requirements- Plan requirements with electrical engineers- Plan proper EUCE grounding/protection.
TDN 2.2	Implement power distribution and grounding requirements <ul style="list-style-type: none">- Review EDL for power requirements- Coordinate power requirements with unit engineers- Ensure all EUCE is properly grounded- Test power and grounding daily- Ensure user compliance with power and grounding requirements
TDN 2.3	Perform limited technical inspection (LTI) <ul style="list-style-type: none">- Determine requirements of the LTI- Develop an LTI checklist- Conduct LTI- Complete the checklist- Document results in EUCE record jacket.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TDN 2.4	Protect electrostatic discharge (ESD) sensitive devices during handling, storage, and transportation <ul style="list-style-type: none"> - Review references - Identify materials requiring ESD protection - Perform actions necessary to protect ESD sensitive materials
TDN 2.5	Implement electromagnetic environmental effects E(3) program <ul style="list-style-type: none"> - Develop design and installation techniques that cover the following areas: <ul style="list-style-type: none"> c. Indirect coupling b. Shielding c. Grounding d. Bonding e. Filtering f. Corrosion control - Develop maintenance standards - Identify and report E3 problems to the unit E3 coordinator.
TDN 2.6	Plan for deployed maintenance support <ul style="list-style-type: none"> - Implement unit EUCE Equipment Density List (EDL) for deployment - Implement unit EUCE EDL checklists for end users - Implement Pre-Expedited Bin (PEB) for unit deployment resources - Coordinate with embark personnel to establish EUCE lift requirements
TDN 2.7	Plan deployment/redeployment EUCE <ul style="list-style-type: none"> - Examine deployment orders/instructions and unit EUCE Equipment Density List (EDL) - Determine equipment requirements - Determine/coordinate with embarkation personnel, special lifting/handling requirements for EUCE - Determine special security requirements for maintenance/maintenance support equipment - Develop instructions for deployment.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TDN 2.8	Assist end users in deployment preparation <ul style="list-style-type: none"> - Implement unit deployment requirements for EUCE - Implement site specific pre-deployment checklists - Provide technical assistance to end users - Provide pre-deployment checklists to end users
TDN 2.9	Use MIMMS/SASSY reports and forms <ul style="list-style-type: none"> - Complete Equipment Repair Order (ERO) and ERO Shopping List (EROSL) - Coordinate with MIMMS/SASSY personnel on DPR and LM2 reports - File the ERO in EUCE record jacket
TDN 2.10	Maintain Marine Corps authorized operating systems and common user software <ul style="list-style-type: none"> - Identify updates provided by vendors for all software - Apply software updates as required - Call appropriate vendor for assistance as necessary - Perform quality control - Ensure compliance with licensing agreements - Document results in EUCE record jacket
DUTY AREA 3	DATA COMMUNICATIONS SYSTEM
TDN 3.1	Install EUCE Hardware <ul style="list-style-type: none"> - Configure internal expansion cards as required - Install internal expansion cards as required - Connect external devices as required - Connect power cables - Power on EUCE - Configure peripheral device software - Perform quality control - Ensure compliance with licensing agreements - Document EUCE setup in EUCE record jacket - Provide user assistance and training as required

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TDN 3.2	Install and configure an EUCE operating system and Marine Corps authorized common user software <ul style="list-style-type: none"> - Install appropriate operating system (OS) software - Configure appropriate operating system (OS) software - Install appropriate common user software - Configure appropriate common user software - Perform quality control - Ensure compliance with licensing agreements - Document software setup in EUCE record jacket - Provide user assistance and training as required
TDN 3.3	Create a network server <ul style="list-style-type: none"> - Review network server configuration documents - Install network server hardware - Install network server software - Configure network server - Verify operation of network server - Take corrective action as required - Document network server configuration.
TDN 3.4	Troubleshoot EUCE <ul style="list-style-type: none"> - Analyze symptoms - Identify hardware/software problems - Use diagnostic hardware/software as required - Take appropriate actions to resolve the problem - Contact appropriate vendor for assistance as required - Perform quality control - Document repairs/replacement in EUCE record jackets
TDN 3.5	Maintain EUCE <ul style="list-style-type: none"> - Determine unit EUCE readiness requirements - Identify EUCE malfunctions as necessary - Provide end users with Preventive Maintenance (PM) checklists - Assist end users with PM as required - Perform scheduled operations checks on all unit EUCE - Perform quality control - Document results of operations checklists in EUCE record jacket - Troubleshoot EUCE as required per 4066.2.3

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
DUTY AREA 4	LOCAL AND WIDE AREA NETWORKS (LANS AND WANS)
TDN 4.1	Plan local area networks <ul style="list-style-type: none"> - Examine the operations order or installation/upgrade requirements - Determine local area network platform to be used - Determine local area network protocol to be used - Create layout diagram of connectivity - Determine best connectivity available - Submit external support requests as required.
TDN 4.2	Install a Local Area Network <ul style="list-style-type: none"> - Install LAN cables according to diagrams - Install connectors where drops belong on the LAN - Install LAN cards as required - Install LAN software as required - Configure LAN software/hardware - Connect microcomputer/EUCE to LAN - Ensure end users have address scheme - Perform quality control - Take corrective action as required - Document network card settings
TDN 4.3	Maintain a Local Area Network <ul style="list-style-type: none"> - Monitor the network utilizing available hardware and software - Monitor network configurations - Modify network configurations as required - Troubleshoot circuit/equipment outages - Repair/Replace defective equipment - Update/Replace defective equipment - Perform quality control.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TDN 4.4	Manage a Local Area Network <ul style="list-style-type: none"> - Manage user accounts - Manage services - Manage server operations - Manage Access Rights Lists (ARL) - Conduct backup procedures - Monitor network software configuration.
TDN 4.5	Direct installation of a local area network <ul style="list-style-type: none"> - Examine LAN diagram and configuration requirements - Ensure sufficient components are on hand for installation (i.e. cable, connectors) - Ensure sufficient tools are on hand for installation - Coordinate installation schedule - Supervise installation.
TDN 4.6	Plan a wide area network <ul style="list-style-type: none"> - Determine wide area network platform to be used - Determine wide are network protocol to be used - Create layout diagram of connectivity - Utilizing the class of IP network assigned examine users requiring IP addresses - Subnet the IP network to maximize effectiveness - Ensure network will support IP connectivity - Submit external support requests as required.
TDN 4.7	Install a Wide Area Network <ul style="list-style-type: none"> - Engineer DTE to DCE connectivity - Install WAN hardware and software as required - Configure WAN hardware and software as required - Implement addressing scheme supporting higher and lower echelon connectivity - Install DCE hardware - Maintain DCE hardware.

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TDN 4.8	Maintain a Wide Area Network <ul style="list-style-type: none"> - Modify/upgrade network software/hardware configuration as required - Troubleshoot circuit/equipment outages - Repair/Replace defective equipment - Update WAN documentation.
TDN 4.9	Manage a Wide Area Network <ul style="list-style-type: none"> - Monitor the network utilizing available hardware and software - Monitor network software/hardware configuration.
TDN 4.10	Direct installation of a Wide Area Network <ul style="list-style-type: none"> - Examine WAN diagram and configuration requirements - Ensure sufficient components are on hand for installation (i.e. cable, connectors) - Ensure sufficient tools are on hand for installation - Coordinate installation schedule - Perform quality control.
TDN 4.11	Install a Network Node <ul style="list-style-type: none"> - Install LAN cards as required - Install LAN software as required - Configure LAN software/hardware - Connect microcomputer/EUCE to LAN - Ensure end users have address scheme - Document network card settings - Install protocol software as required - Configure the addressing scheme as required - Perform quality control - Take corrective action as required.
TDN 4.12	Implement Network Services <ul style="list-style-type: none"> - Manage Network protocols. (VINES IP, Novell IP, TCP/IP) - Install mail transfer software as required - Manage mail transfer protocols (SMTP, Vines Intelligent Messaging) - Monitor the mail transfer protocols

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
	<ul style="list-style-type: none"> - Update mail transfer software as required - Install Terminal Emulation Services as required. - Create/Delete/Modify user aliases as required. - Install DNS software as required. - Monitor DNS software/hardware configuration. - Coordinate with agencies as required. - Verify system operation. - Take corrective action as required.
TDN 4.13	Supervise operation of a network operation / information center
	<ul style="list-style-type: none"> - Organize personnel - Monitor network performance - Dispatch troubleshooting teams - Maintain daily performance and outage/restoration logs - Implement quality control procedures
DUTY AREA 5 SYSTEM	APPLICATION AND DATABASE MANAGEMENT
DUTY AREA 6	SYSTEM ASSURANCE
TDN 6.1	Implement ADP/Data communications security measures
	<ul style="list-style-type: none"> - Review applicable directives - Identify local security concerns - Implement site specific ADP/Data Communications security procedures - Implement EUCE virus protection procedures - Implement Network Security procedures - Monitor adherence to ADP/Data Communications security procedures - Take appropriate action on procedure violations

<u>Task ID</u>	<u>Task Description & Performance Measures</u>
TDN 6.2	<p>Coordinate communications material security system (CMS) support</p> <ul style="list-style-type: none"> - Examine the Annex K or LOI. - Determine the cryptographic equipment requirements - Coordinate with the CMS custodian to ensure equipment and material is available for deployment and embarked - Ensure personnel are authorized to use equipment.
TDN 6.3	<p>Employ CRYPTO Equipment</p> <ul style="list-style-type: none"> - Examine circuit diagrams and determine cables required to install cryptographic equipment - Install cryptographic equipment into data communications network - Operate cryptographic equipment - Troubleshoot cryptographic equipment - Remove and replace defective cryptographic equipment.

APPENDIX E. INFORMATION TECHNOLOGY SERVICES QUESTIONNAIRE

April, 1999

This questionnaire was developed as part of a research project designed to identify the Information Technology (IT) core competencies of a Marine regiment. The questionnaire helps to identify the background and experiences of IT support personnel as well as their understanding of the planning, problem tracking, and reporting necessary in a regimental size organization.

On the following pages you will find several different questions relating to your background and experience, planning and skills with respect to supporting information technology assets. Instructions for filling out the questionnaire are provided at the top of the next page. It should take no more than 10 minutes to complete the entire questionnaire.

The questions are designed to obtain your perceptions with regard to background and experiences. Please do not answer the questionnaire as you think someone else would want. It is important to capture your perceptions and your reactions to each question.

There are no "trick" questions. Your individual answers will be kept completely confidential. Please answer each item as honestly and frankly as possible.

Thank you for your cooperation.

For more information about this questionnaire and its uses, please contact:

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Please indicate your response by circling the most appropriate alternative listed or by writing the answer in the space provided.

Background and Experience

1. What is your parent command (example: 1st Marine Division G-6, 1st Marine Regiment S-6, etc.)? *(Please write-in the appropriate response.)*

(9): Regiment A, (18) Regiment B, (10) Regiment C

2. What is your current military occupational specialty (MOS, example: 0602, 2542, 2818, 4066, 4068, etc.)? *(Please write-in the appropriate response.)*

**(5) 0602, (2) 2519, (4) 2537, (5) 2542, (2) 2549, (4) 2591,
(1) 2818, (1) 2861 (12) 4066, (1) 4068**

3. How many years have you served in the Marine Corps?

less than 2 years	2-4 years	4-6 years	6-8 years	more than 8 years
(8)	(7)	(1)	(3)	(18)

4. What is your current rank (example: Private, Corporal, Staff Sergeant, Captain, etc.)?

**(2) Major, (2) Captain, (1) 2nd Lt, (1) MGySgt, (2) MSgt, (3) GySgt,
(8) SSgt, (3) Sgt, (5) Cpl, (8) LCpl, (2) PFC**

5. How many years have you served in your current military occupational specialty?

less than 2 years	2-4 years	4-6 years	6-8 years	more than 8 years
(12)	(11)	(0)	(4)	(10)

6. What is your current billet assignment (example: Automated Data Processing Equipment (ADPE) Chief, ADPE Technician, etc.)?

**(3) S-6, (2) ISMO, (2) Wire Chief, (3) Radio Chief, (2) Plt Sgt
(2) Comm Chief, (2) EKMS Managers, (1) Pubs NCO, (8) Networks,
(4) ISC Chief, (2) Message Ctr Chief, (2) Info Sys Specialist**

7. How many months have you served in your current billet assignment?

Less than 6 months	6-12 months	12-18 months	18-24 months	24-36 months	More than 36 months
(10)	(9)	(7)	(6)	(3)	(2)

8. How much formal training (formal schools, local classroom, or contractor provided training) do you have with regard to ADPE (such as networks, servers, PCs, etc.)?

Less than 1 month	1-3 months	3-6 months	6-12 months	More than 12 months
(12)	(18)	(5)	(1)	(1)

9. How many users require ADPE support within your parent command? (Only include those requiring access to a computer within your unit.)

	No answer				
0	1-75	76-150	151-225	226-300	301 or more
(0)	(6)	(4)	(10)	(1)	(14) (2)

10. How many personnel does your unit have to provide ADPE support for their parent command (regardless of existing table of organizations or staffing levels)?

No answer	No staff	1-3	4-7	8-11	12 or more _____ (Please specify)
(3)	(0)	(3)	(15)	(11)	(5)

11. How many personnel does your unit require to provide ADPE support for their parent command?

No answer	No staff	1-3	4-7	8-11	12 or more _____ (Please specify)
(4)	(0)	(3)	(9)	(14)	(5)

12. What is the average amount of time you spend each week in the performance of your regular duties (those duties related directly to ADPE support)?

No answer	30 or fewer hours	31-40 hours	41-50 hours	51-60 hours	61 or more hours
(1)	(13)	(5)	(4)	(10)	(4)

Planning

1. To what extent does your unit develop an annual strategy (plan) for ADPE requirements?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(0)	(1)	(3)	(8)	(11)	(5)	(9)

2. To what extend do other sections within your command (G/S-1 through G/S-6, Supply, etc.) read the annual strategy?

No answer	N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(2)	(0)	(4)	(13)	(5)	(1)	(1)	(11)

3. To what extent is the annual strategy written in a non-technical language that is understood by the entire staff (G/S-1 through G/S-6, Supply, etc.)?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(0)	(5)	(7)	(12)	(3)	(0)	(10)

4. To what extent does the annual strategy include goals/objectives that are meaningful to the entire staff (G/S-1 through G/S-6, Supply, etc.)?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(3)	(3)	(10)	(6)	(2)	(12)

5. To what extent does the annual strategy specify staffing levels of the ADPE support section?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(4)	(6)	(8)	(3)	(1)	(14)

6. To what extent is the priority-setting process for the ADPE section understood throughout the entire staff (G/S-1 through G/S-6, Supply, etc.)?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(3)	(9)	(9)	(4)	(0)	(11)

Problem Tracking and Reporting

1. To what extent is there a system in place for recording/tracking ADPE problems?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(0)	(2)	(10)	(10)	(9)	(5)

2. Do users with an ADPE related problem know whom to contact for the appropriate corrective action?

No answer	Less than 20 %	20 – 40%	41 – 60%	61 – 80%	More than 81%
(1)	(0)	(0)	(3)	(6)	(27)

3. To what extent is it clear to users who to call regarding different levels of ADPE related problems?

No answer	N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(3)	(0)	(0)	(3)	(10)	(10)	(9)	(2)

4. To what extent are there procedures for measuring usage of major ADPE services within your unit (such as CPU/Server hours, online transactions, network congestion, printed pages, e-mail messages, etc.)?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(0)	(5)	(10)	(4)	(3)	(4)	(10)

5. To what extent are there procedures for dealing with usage levels of ADPE services?

No answer	N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(0)	(2)	(12)	(5)	(4)	(3)	(10)

6. To what extend are regular status reports of ADPE services issued to the heads of other sections within your unit?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(0)	(10)	(7)	(3)	(6)	(0)	(11)

7. To what extent is a quality assurance program used within your parent command regarding ADPE services?

N/A (0)	Not at all (5)	Little extent (5)	Some extent (9)	Significant extent (3)	Great extent (1)	Don't know (14)
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ADPE Support Personnel

1. To what extent are the users within your unit willing to abide by the ADPE guidelines and standards?

N/A (0)	Not at all (0)	Little extent (6)	Some extent (18)	Significant extent (5)	Great extent (5)	Don't know (3)
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2. To what extent are the abilities of the ADPE personnel matched with user requirements?

N/A (0)	Not at all (0)	Little extent (3)	Some extent (11)	Significant extent (14)	Great extent (7)	Don't know (2)
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3. To what extent are expectations of end users realistic?

No answer (1)	N/A (0)	Not at all (0)	Little extent (4)	Some extent (16)	Significant extent (11)	Great extent (2)	Don't know (3)
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4. To what extent does the unit's funding of ADPE match the expectations of the end user?

No answer (2)	N/A (0)	Not at all (5)	Little extent (13)	Some extent (7)	Significant extent (2)	Great extent (0)	Don't know (8)
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5. To what extent are the users' perceptions about the quality of computer services favorable?

N/A (0)	Not at all (1)	Little extent (5)	Some extent (19)	Significant extent (9)	Great extent (1)	Don't know (2)
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6. To what extent does the level of funding accurately reflect the level of importance that ADPE has for your unit?

No answer	N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(0)	(2)	(10)	(7)	(8)	(1)	(8)

7. To what extent do requests for funding of additional resources (microcomputers, disk space, peripherals, etc.) come from the users, rather than from the ADPE support section?

No answer	N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(1)	(0)	(3)	(8)	(8)	(6)	(2)	(9)

8. If the ADPE support section were in a competitive situation, to what extent are you confident that it would retain its customer base?

N/A	Not at all	Little extent	Some extent	Significant extent	Great extent	Don't know
(0)	(5)	(11)	(10)	(8)	(3)	(0)

Thank you for completing the Information Technology Services Questionnaire (ITSQ). Please return the completed survey to your Officer in Charge (OIC) . Results of the ITSQ will be made available to your command within ninety days.

Information Technology Services Questionnaire Results

Number	BAE1	BAE2	BAE3	BAE4	BAE5
1	Regiment B	0602	more than 8 year	Major	more than 8 year
2	Regiment C	0602	more than 8 year	Major	6-8 years
3	Regiment A	0602	more than 8 year	Captain	more than 8 year
4	Regiment B	0602	more than 8 year	Captain	2-4 years
5	Regiment B	0602	4-6 years	2ndLt	Less than 2 year
6	Regiment C	2519	more than 8 year	SSGT	6-8 years
7	Regiment B	2519	more than 8 year	GYSGT	more than 8 year
8	Regiment B	2537	more than 8 year	SSGT	2-4 years
9	Regiment A	2537	more than 8 year	SSGT	more than 8 year
10	Regiment A	2537	more than 8 year	SSGT	more than 8 year
11	Regiment C	2537	more than 8 year	GYSGT	more than 8 year
12	Regiment B	2542	6-8 years	SGT	6-8 years
13	Regiment B	2542	6-8 years	SGT	2-4 years
14	Regiment B	2542	2-4 years	LCPL	2-4 years
15	Regiment A	2542	2-4 years	CPL	2-4 years
16	Regiment C	2542	2-4 years	CPL	2-4 years
17	Regiment A	2549	more than 8 year	SSGT	more than 8 year
18	Regiment C	2549	more than 8 year	SSGT	more than 8 year
19	Regiment B	2591	more than 8 year	MSGT	more than 8 year
20	Regiment B	2591	more than 8 year	MSGT	more than 8 year
21	Regiment C	2591	more than 8 year	MGYSGT	6-8 years
22	Regiment B	2591	more than 8 year	GYSGT	Less than 2 year
23	Regiment C	2818	2-4 years	CPL	Less than 2 year
24	Regiment C	2861	more than 8 year	SSGT	2-4 years
25	Regiment B	4066	more than 8 year	SSGT	Less than 2 year
26	Regiment B	4066	2-4 years	SGT	2-4 years
27	Regiment A	4066	less than 2 year	PFC	Less than 2 year
28	Regiment B	4066	less than 2 year	PFC	Less than 2 year
29	Regiment A	4066	less than 2 year	LCPL	Less than 2 year
30	Regiment B	4066	less than 2 year	LCPL	Less than 2 year
31	Regiment B	4066	less than 2 year	LCPL	Less than 2 year
32	Regiment B	4066	less than 2 year	LCPL	Less than 2 year
33	Regiment B	4066	less than 2 year	LCPL	Less than 2 year
34	Regiment A	4066	less than 2 year	LCPL	Less than 2 year
35	Regiment C	4066	2-4 years	CPL	2-4 years
36	Regiment A	4066	2-4 years	CPL	2-4 years
37	Regiment C	4068	6-8 years	LCPL	2-4 years

Legend:

BAE#: Represents Background and Experience questions 1 through 5.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	BAE6	BAE7	BAE8
1	S-6	24-36 months	3-6 months
2	S-6	6-12 months	1-3 months
3	S-6	6-12 months	Less than 1 month
4	ISMO	6-12 months	1-3 months
5	ISMO (Replacement)	Less than 6 months	1-3 months
6	Wire Chief	12-18 months	3-6 months
7	Wire Chief	6-12 months	1-3 months
8	Radio Chief	12-18 months	1-3 months
9	Platoon Sergeant	Less than 6 months	Less than 1 month
10	Radio Chief	Less than 6 months	Less than 1 month
11	Radio Chief	Less than 6 months	Less than 1 month
12	ISC MIMMS	18-24 months	1-3 months
13	ISC Network Administrator	24-36 months	1-3 months
14	ISC Network asst	18-24 months	Less than 1 month
15	ISC Message Center Chief	6-12 months	Less than 1 month
16	ISC Chief	Less than 6 months	Less than 1 month
17	ISC Comm Ctr Chief	12-18 months	Less than 1 month
18	EKMS Manager	18-24 months	Less than 1 month
19	S-6 Chief	More than 36 months	3-6 months
20	Communications Chief	More than 36 months	More than 12 months
21	Communications Chief	18-24 months	1-3 months
22	EKMS Manager	12-18 months	1-3 months
23	Publications NCO	18-24 months	3-6 months
24	Tech Chief, Plt Sergeant	24-36 months	Less than 1 month
25	ISC Chief	12-18 months	3-6 months
26	ISC Routers & Switches	18-24 months	1-3 months
27	ISC ADPE Tech	Less than 6 months	1-3 months
28	ISC Network asst	Less than 6 months	1-3 months
29	ISC ADPE Tech	12-18 months	1-3 months
30	ISC Router asst	12-18 months	Less than 1 month
31	ISC Router asst	6-12 months	Less than 1 month
32	ISC MIMMS asst	6-12 months	1-3 months
33	ISC Network asst	6-12 months	1-3 months
34	Asst ISC Chief	Less than 6 months	1-3 months
35	LAN Administrator	6-12 months	1-3 months
36	ISC Chief	Less than 6 months	1-3 months
37	Information System Specialist	Less than 6 months	6-12 months

Legend:

BAE#: Represents Background and Experience questions 6 through 8.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	BAE9	BAE10	BAE11	BAE12	Plan1
1	151-225	8-11	8-11	31-40 hours	Great extent
2	226-300	4-7	12	31-40 hours	Some Extent
3	301 or more	4-7	8-11	30 or fewer hours	Some Extent
4	301 or more	12 or more	12 or more	51-60 hours	Great extent
5	301 or more	19	20	31-40 hours	Little extent
6	151-225	8-11	8-11	30 or fewer	Great extent
7	76-150	8-11			Don't know
8				30 or fewer	Don't know
9	76-150	4-7	8-11	31-40 hours	Some Extent
10	76-150	4-7	4-7	30 or fewer hours	Significant extent
11	1-75	8-11	1-3	30 or fewer	Don't know
12	301 or more	8-11	8-11	61 or more hours	Some Extent
13	301 or more	8-11	8-11	61 or more hours	Significant extent
14	301 or more	8-11	8-11	41-50 hours	Don't know
15	151-225	4-7	4-7	51-60 hours	Some Extent
16	1-75	4-7		51-60 hours	Some Extent
17	301 or more	8-11	8-11	51-60 hours	Significant extent
18	1-75	1-3	1-3	51-60 hours	Don't know
19	301 or more	17	20	30 or fewer	Significant extent
20		22	18	30 or fewer	Significant extent
21	76-150	4-7	4-7	30 or fewer	Significant extent
22	1-75	4-7	8-11	30 or fewer	Significant extent
23	151-225	1-3	1-3	30 or fewer	Don't know
24	1-75	1-3	4-7	30 or fewer	Don't know
25	301 or more	17	17	61 or more hours	Great extent
26	301 or more	8-11	8-11	51-60 hours	Little extent
27	151-225	4-7	4-7	41-50 hours	Don't know
28	301 or more	8-11	8-11	51-60 hours	Some Extent
29	151-225	4-7	4-7	51-60 hours	Significant extent
30	301 or more	4-7	12 or more	41-50 hours	Great extent
31	301 or more	8-11	8-11	30 or fewer hours	Little extent
32	151-225			30 or fewer hours	Don't know
33	301 or more		4-7	61 or more hours	Not at all
34	151-225	4-7	4-7	51-60 hours	Some Extent
35	151-225	4-7	4-7	41-50 hours	Significant extent
36	151-225	4-7	8-11	51-60 hours	Significant extent
37	1-75	4-7	8-11	31-40 hours	Significant extent

Legend:

BAE#: Represents Background and Experience questions 9 through 12.

Plan#: Planning question 1.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	Plan2	Plan3	Plan4	Plan5
1	Little Extent	Little extent	Some Extent	Not at all
2	Little Extent	Some Extent	Some Extent	Not at all
3	Little Extent	Significant extent	Some Extent	Some extent
4	Not at all	Not at all	Not at all	Not at all
5	Little Extent	Little extent	Little extent	Little extent
6	Some extent	Some Extent	Significant extent	Significant extent
7	Don't know	Don't know	Don't know	Don't know
8	Don't know	Don't know	Don't know	Don't know
9	Some extent	Some Extent	Don't know	Don't know
10	Don't know	Some Extent	Significant extent	Don't know
11	Don't know	Don't know	Don't know	Don't know
12	Little Extent	Little extent	Some Extent	Little extent
13	Little Extent	Don't know	Significant extent	Little extent
14	Don't know	Don't know	Don't know	Don't know
15	Some extent	Some Extent	Some Extent	
16	Some extent	Little extent	Don't know	Don't know
17	Little Extent	Not at all	Some Extent	Significant extent
18	Don't know	Don't know	Don't know	Don't know
19	Some extent	Some Extent	Some Extent	Some extent
20	Don't know	Some Extent		Some extent
21	Little Extent	Significant extent	Some Extent	Not at all
22	Little Extent	Some Extent	Significant extent	Some extent
23	Don't know	Don't know	Don't know	Don't know
24	Don't know	Don't know	Don't know	Don't know
25	Little Extent	Some Extent	Little extent	Great extent
26	Not at all	Not at all	Great extent	Don't know
27	Don't know	Don't know	Don't know	Don't know
28		Little extent	Some Extent	Little extent
29	Little Extent	Little extent	Not at all	Some extent
30	Great extent	Significant extent	Great extent	Some extent
31	Not at all	Not at all	Don't know	Don't know
32	Don't know	Don't know	Don't know	Don't know
33		Not at all	Not at all	Some extent
34	Little Extent	Some Extent	Little extent	Little extent
35	Little Extent	Some Extent	Significant extent	Some extent
36	Not at all	Little extent	Significant extent	Little extent
37	Significant extent	Some Extent	Some Extent	Significant extent

Legend:

Plan#: Planning questions 2 through 5.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	Plan6	PTR1	PTR2	PTR3
1	Little extent	Great extent	more than 81%	Great extent
2	Not at all	Significant extent	61-80%	
3	Significant extent	Some extent	more than 81%	
4	Not at all	Great extent	more than 81%	Significant extent
5	Little extent	Some extent	61-80%	Little extent
6	Some extent	Little extent	61-80%	Some extent
7	Don't know	Don't know	more than 81%	Some extent
8	Don't know	Don't know	more than 81%	Significant extent
9	Don't know	Don't know	41-60%	Don't know
10	Don't know	Some extent	more than 81%	Great extent
11	Don't know	Don't know	61-80%	Significant extent
12	Little extent	Significant extent	61-80%	Some extent
13	Little extent	Significant extent	more than 81%	
14	Don't know	Some extent	more than 81%	Significant extent
15	Little extent	Significant extent	more than 81%	Some extent
16	Significant extent	Little extent	more than 81%	Little extent
17	Some extent	Great extent	more than 81%	Great extent
18	Don't know	Don't know	more than 81%	Great extent
19	Significant extent	Great extent	more than 81%	Great extent
20	Little extent	Some extent	61-80%	Some extent
21	Little extent	Some extent	more than 81%	Great extent
22	Some extent	Significant extent	41-60%	Some extent
23	Don't know	Some extent	more than 81%	Some extent
24	Don't know	Some extent	41-60%	Some extent
25	Some extent	Significant extent	more than 81%	Significant extent
26	Not at all	Great extent	more than 81%	Great extent
27	Don't know	Significant extent	more than 81%	Don't know
28	Little extent	Great extent	more than 81%	Great extent
29	Some extent	Significant extent	more than 81%	Significant extent
30	Significant extent	Great extent	more than 81%	Significant extent
31	Don't know	Significant extent	more than 81%	Significant extent
32	Some extent	Significant extent	more than 81%	Some extent
33				Some extent
34	Some extent	Great extent	more than 81%	Great extent
35	Some extent	Some extent	more than 81%	Significant extent
36	Little extent	Great extent	more than 81%	Little extent
37	Some extent	Some extent	more than 81%	Significant extent

Legend:

Plan#: Planning question 6.

PTR#: Problem Tracking and Reporting 1 through 3.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	PTR4	PTR5	PTR6	PTR7
1	Little extent	Some extent	Not at all	Not at all
2	Some extent		Significant extent	Some extent
3	Little extent	Little extent	Little extent	Some extent
4	Not at all	Not at all	Little extent	Great extent
5	Little extent	Little extent	Little extent	Little extent
6	Great extent	Significant extent	Significant extent	Some extent
7	Don't know	Don't know	Don't know	Don't know
8	Don't know	Don't know	Not at all	Don't know
9	Don't know	Little extent	Don't know	Don't know
10	Don't know	Don't know	Don't know	Don't know
11	Don't know	Don't know	Don't know	Don't know
12	Little extent	Little extent	Not at all	Not at all
13	Little extent	Little extent	Not at all	Little extent
14	Not at all	Don't know	Don't know	Don't know
15	Some extent	Some extent	Significant extent	Some extent
16	Not at all	Little extent	Not at all	Don't know
17	Great extent	Great extent	Not at all	Some extent
18	Don't know	Don't know	Don't know	Don't know
19	Great extent	Great extent	Don't know	Don't know
20	Significant extent	Some extent	Some extent	Some extent
21	Some extent	Significant extent	Not at all	Not at all
22	Significant extent	Some extent	Some extent	Significant extent
23	Don't know	Don't know	Don't know	Don't know
24	Don't know	Don't know	Little extent	Don't know
25	Little extent	Little extent	Some extent	Some extent
26	Some extent	Some extent	Don't know	Don't know
27	Don't know	Don't know	Don't know	Don't know
28	Great extent	Little extent	Significant extent	Little extent
29	Significant extent	Great extent	Little extent	Some extent
30	Some extent	Significant extent	Significant extent	Significant extent
31	Don't know	Don't know	Not at all	Not at all
32	Little extent	Not at all	Don't know	Don't know
33	Not at all	Little extent	Not at all	Not at all
34	Little extent	Significant extent	Significant extent	Significant extent
35	Little extent	Little extent	Little extent	Little extent
36	Not at all	Little extent	Not at all	Little extent
37	Little extent	Little extent	Little extent	Some extent

Legend:

PTR#: Problem Tracking and Reporting 4 through 7.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	ASP1	ASP2	ASP3	ASP4
1	Some extent	Significant extent	Some extent	Little extent
2	Some extent	Some extent	Some extent	
3	Little extent	Some extent		Significant extent
4	Some extent	Little extent	Some extent	Not at all
5	Significant extent	Significant extent	Significant extent	Not at all
6	Some extent	Great extent	Significant extent	Some extent
7	Great extent	Some extent	Some extent	Don't know
8	Don't know	Don't know	Little extent	Not at all
9	Some extent	Significant extent	Don't know	Don't know
10	Some extent	Significant extent	Some extent	Little extent
11	Significant extent	Significant extent	Significant extent	Don't know
12	Some extent	Significant extent	Significant extent	Little extent
13	Little extent	Little extent	Little extent	Not at all
14	Some extent	Significant extent	Some extent	Little extent
15	Some extent	Some extent	Significant extent	Some extent
16	Some extent	Some extent	Little extent	Don't know
17	Some extent	Some extent	Some extent	Little extent
18	Great extent	Significant extent	Significant extent	Don't know
19	Great extent	Great extent	Significant extent	Little extent
20	Significant extent	Some extent	Some extent	Little extent
21	Some extent	Significant extent	Some extent	
22	Some extent	Some extent	Some extent	Some extent
23	Significant extent	Don't know	Don't know	Don't know
24	Little extent	Some extent	Don't know	Don't know
25	Little extent	Significant extent	Some extent	Some extent
26	Some extent	Great extent	Some extent	Little extent
27	Don't know	Great extent	Significant extent	Don't know
28	Great extent	Great extent	Significant extent	Little extent
29	Some extent	Significant extent	Some extent	Little extent
30	Great extent	Great extent	Significant extent	Some extent
31	Some extent	Some extent	Some extent	Little extent
32	Some extent	Significant extent	Little extent	Little extent
33	Don't know	Significant extent	Great extent	Not at all
34	Significant extent	Great extent	Great extent	Some extent
35	Little extent	Significant extent	Significant extent	Significant extent
36	Little extent	Some extent	Some extent	Some extent
37	Some extent	Little extent	Some extent	Little extent

Legend:

ASP#: ADPE Support Personnel 1 through 4.

Highlighted sections indicate responses from personnel performing IT support functions.

Number	ASP5	ASP6	ASP7	ASP8
1	Some extent	Some extent	Significant extent	Not at all
2	Some extent			Some extent
3	Significant extent	Significant extent	Little extent	Not at all
4	Little extent	Little extent	Little extent	Little extent
5	Some extent	Little extent	Little extent	Not at all
6	Some extent	Significant extent	Significant extent	Great extent
7	Little extent	Don't know	Some extent	Some extent
8	Not at all	Don't know	Don't know	Not at all
9	Don't know	Don't know	Don't know	Significant extent
10	Significant extent	Significant extent	Some extent	Little extent
11	Some extent	Don't know	Don't know	Some extent
12	Little extent	Little extent	Significant extent	Some extent
13	Some extent	Not at all	Great extent	Little extent
14	Significant extent	Some extent	Some extent	Significant extent
15	Some extent	Little extent	Little extent	Significant extent
16	Little extent	Don't know	Don't know	Some extent
17	Some extent	Significant extent	Not at all	Significant extent
18	Significant extent	Don't know	Don't know	Significant extent
19	Significant extent	Some extent	Don't know	Little extent
20	Some extent	Significant extent	Significant extent	Some extent
21	Some extent	Some extent	Little extent	Some extent
22	Some extent	Some extent	Little extent	Some extent
23	Some extent	Some extent	Don't know	Significant extent
24	Little extent	Don't know	Don't know	Little extent
25	Some extent	Little extent	Some extent	Little extent
26	Some extent	Not at all	Little extent	Not at all
27	Great extent	Don't know	Don't know	Great extent
28	Significant extent	Little extent	Not at all	Little extent
29	Some extent	Little extent	Significant extent	Significant extent
30	Significant extent	Little extent	Some extent	Some extent
31	Some extent	Significant extent	Significant extent	Little extent
32	Some extent	Little extent	Not at all	Little extent
33	Don't know	Great extent	Great extent	Little extent
34	Significant extent	Significant extent	Some extent	Some extent
35	Significant extent	Significant extent	Little extent	Great extent
36	Some extent	Some extent	Some extent	Significant extent
37	Some extent	Little extent	Some extent	Little extent

Legend:

ASP#: ADPE Support Personnel 5 through 8.

Highlighted sections indicate responses from personnel performing IT support functions.

APPENDIX F. INTERVIEW QUESTIONS

- 1. What part of the regiment would you identify as the heart of the organization?**
 - a. Regiment C (Major, 0602): S-3 Operations
 - b. Regiment C (MgySgt, 2591): S-3 Operations
 - c. Regiment C (CPL, 4066): Support the battalions and provide leadership for the MAGTF.
 - d. Regiment C (CPL, 2542): Support the battalions through the division.
 - e. Regiment C (CPL, 2818): Communications. Without communications the mission can not be accomplished.
 - f. Regiment C (LCPL, 4068): I am not sure what part of the regiment is the heart.
 - g. Regiment B (Major, 0602): S-3
 - h. Regiment B (Captain, 0602): LAN System referred to as TAC 1.
 - i. Regiment B (SSgt, 4066): S-3
 - j. Regiment B (Sgt, 2542): battalions.
 - k. Regiment B (Sgt, 2542): S-4
 - l. Regiment B (Sgt, 4066): Command Element
 - m. Regiment B (LCpl, 2542): Hqtrs Company
 - n. Regiment B (LCpl, 4066): Command Element
 - o. Regiment B (LCpl, 4066): Battalions
 - p. Regiment B (LCpl, 4066): Battalions
 - q. Regiment B (PFC, 4066): Hqtrs Company
 - r. Regiment A (Captain, 0602): S-6
 - s. Regiment A (SSgt, 2549): S-6
 - t. Regiment A (Cpl, 4066): S-3
 - u. Regiment A (Cpl, 2542): S-6
 - v. Regiment A (LCpl, 4066): Headquarters Company
 - w. Regiment A (LCpl, 4066): S-3
 - x. Regiment A (PFC, 4066): Headquarters Company
- 2. What part of the Communications section would you identify as the heart of the organization?**
 - a. Regiment C (Major, 0602): Radio section
 - b. Regiment C (MgySgt, 2591): While in a tactical scenario the Radio section is the heart with a migration to the Data section. While in garrison the data section is the heart.
 - c. Regiment C (CPL, 4066): In garrison it is the ISC Section. In the field it is the Radio section however, the focus is shifting to the ISC section.
 - d. Regiment C (CPL, 2542): Support other sections in their mission through organic communication systems (radio in the field, computers in garrison).

- e. Regiment C (CPL, 2818): Radio section. We do some computers, however, most of our support is provided by the radio section.
 - f. Regiment C (LCPL, 4068): Not sure.
 - g. Regiment B (Major, 0602): ISMO in garrison and radio in the field
 - h. Regiment B (Captain, 0602): ISMO in garrison and radio in the field
 - i. Regiment B (SSgt, 4066): The S-6
 - j. Regiment B (Sgt, 2542): Radio, without the path our networks are dead.
 - k. Regiment B (Sgt, 2542): ISMO
 - l. Regiment B (Sgt, 4066): ISMO
 - m. Regiment B (LCpl, 2542): S-6 Headquarters
 - n. Regiment B (LCpl, 4066): S-6 Headquarters
 - o. Regiment B (LCpl, 4066): ISMO in garrison and radio in the field
 - p. Regiment B (LCpl, 4066): ISMO
 - q. Regiment B (PFC, 4066): Radio
 - r. Regiment A (Captain, 0602): Radio
 - s. Regiment A (SSgt, 2549): Data Section
 - t. Regiment A (Cpl, 4066): Radio
 - u. Regiment A (Cpl, 2542): Data Section
 - v. Regiment A (LCpl, 4066): Data Section in garrison, Radio in the field
 - w. Regiment A (LCpl, 4066): Data Section in garrison, Radio in the field
 - x. Regiment A (PFC, 4066): Data Section
3. **What part of the data communications section would you identify as the heart?**
- a. Regiment C (Major, 0602): Troubleshooting/help desk
 - b. Regiment C (MgySgt, 2591): The largest percentage of work is directed towards supporting the garrison architecture and responding to trouble calls. 50% of the trouble calls are a result of self inflicted wounds caused by operator error (lack of basic training for the typical user of personnel computers).
 - c. Regiment C (CPL, 4066): Keep the computers running, keep viruses off the machines, maintain the appropriate software and support network connectivity for all Marines in the regiment.
 - d. Regiment C (CPL, 2542): ISC is the heart of the Communications section while in garrison and radio is while in the field, however, ISC is becoming more important all the time.
 - e. Regiment C (CPL, 2818): Not sure.
 - f. Regiment C (LCPL, 4068): The ISC section.
 - g. Regiment B (Major, 0602): Network section
 - h. Regiment B (Captain, 0602): ISC Chief
 - i. Regiment B (SSgt, 4066): LAN Admin
 - j. Regiment B (Sgt, 2542): Server (LAN) Admin
 - k. Regiment B (Sgt, 2542): Network, Server (LAN) Admin
 - l. Regiment B (Sgt, 4066): Servers, routers, (LAN) Admin

- m. Regiment B (LCpl, 2542): ISMO
- n. Regiment B (LCpl, 4066): ISMO
- o. Regiment B (LCpl, 4066): Network, Server (LAN) Admin
- p. Regiment B (LCpl, 4066): New NT stuff and architecture
- q. Regiment B (PFC, 4066): ISC Chief
- r. Regiment A (Captain, 0602): The ISC Chief
- s. Regiment A (SSgt, 2549): The ISC Chief
- t. Regiment A (Cpl, 4066): Everyone in the Data Section works together to accomplish the mission
- u. Regiment A (Cpl, 2542): Everyone in the Data Section works together to accomplish the mission
- v. Regiment A (LCpl, 4066): In Garrison, the ISC Chief. In the field it is Server Administration
- w. Regiment A (LCpl, 4066): Everyone in the Data Section works together to accomplish the mission.
- x. Regiment A (PFC, 4066): The ISC Chief

4. What is the mission of your unit?

- a. Regiment C (Major, 0602): Planning, installing, operating and maintaining the communications information systems (i.e. networks, radios wire, and data).
- b. Regiment C (MgySgt, 2591): Supporting the regiment via radio and data communication systems.
- c. Regiment C (CPL, 4066): I work in the ISC section as the LAN Administrator, TASO and supervise the troubleshooting section.
- d. Regiment C (CPL, 2542): ISC section supports the regiment's computer network and equipment.
- e. Regiment C (CPL, 2818): I repair radio and wire equipment for the communications section.
- f. Regiment C (LCPL, 4068): Provide command and control for the regiment.
- g. Regiment B (Major, 0602): Provide C2 and information systems support to the regiment
- h. Regiment B (Captain, 0602): Provide network connectivity for the regiment
- i. Regiment B (SSgt, 4066): Provide network connectivity to the regiment
- j. Regiment B (Sgt, 2542): Provide ADPE assets and support to the regiment.
- k. Regiment B (Sgt, 2542): Provide ADPE resources to users thus increase their mission abilities.
- l. Regiment B (Sgt, 4066): LAN access, trouble shooting, PC tracking and ADPE support.
- m. Regiment B (LCpl, 2542): Provide email, shared files, Internet access and networking support to the regiment.
- n. Regiment B (LCpl, 4066): Provide Internet connectivity and computer services for the regiment and battalions.

- o. Regiment B (LCpl, 4066): Become as proficient as possible.
- p. Regiment B (LCpl, 4066): Provide service to the regiment.
- q. Regiment B (PFC, 4066): Provide email and internet access for the SIPRNET and NIPRNET
- r. Regiment A (Captain, 0602): Facilitate Command and Control internally and externally by all means available.
- s. Regiment A (SSgt, 2549): Provide communications for the regiment to include data, voice, and message traffic.
- t. Regiment A (Cpl, 4066): Support users with ADPE services, trouble calls, training, and keeping the network running. In the field we do tactical networking.
- u. Regiment A (Cpl, 2542): Provide services and support for customers. Fix and repair, as necessary to provide the support required by our users.
- v. Regiment A (LCpl, 4066): Provide a reliable and efficient means of communications in garrison and tactical areas.
- w. Regiment A (LCpl, 4066): Provide support to the users. Keep them happy. Portray a good image for us.
- x. Regiment A (PFC, 4066): Keep the LAN up around the camp. Provide the users the best ADPE support possible.

5. What is your mission (the individual's mission not the units)?

- a. Regiment C (Major, 0602): I am the Commander's subject matter expert for command and control. Responsible for providing the paths to support the flow of information and systems integration for the commander (includes requirement analysis).
- b. Regiment C (MgySgt, 2591): Directly assist the communications officer in the administration of the communications platoon.
- c. Regiment C (CPL, 4066): The job of LAN Administrator requires me to support the network, NICs, user accounts and the topology.
- d. Regiment C (CPL, 2542): As the ISC Chief, I oversee a network of 65 or so machines, ensuring users can access their email and shared files. I don't help the users with applications beyond loading the software (it's not my job).
- e. Regiment C (CPL, 2818): Publications NCO, I also perform repairs on communications equipment.
- f. Regiment C (LCPL, 4068): Make sure the Marines working in the ISC section can gain as much information about data communications from myself as possible.
- g. Regiment B (Major, 0602): Training
- h. Regiment B (Captain, 0602): Provide the plan to accomplish/fulfill the mission
- i. Regiment B (SSgt, 4066): Make sure the Marines are doing their job.
- j. Regiment B (Sgt, 2542): ISC Chief, control/manage Marines, set priorities for the ISMO. Training and purchasing issues as well.
- k. Regiment B (Sgt, 2542): Maintain accountability of all ADPE, their condition, procurement, and redistribution.

- i. Regiment B (Sgt, 4066): Routers, IP addresses, switches, and servers.
 - m. Regiment B (LCpl, 2542): LAN accounts, build and maintain all accounts for Banyan and NT.
 - n. Regiment B (LCpl, 4066): Provide network support to everyone in the regiment.
 - o. Regiment B (LCpl, 4066): Become as proficient as possible.
 - p. Regiment B (LCpl, 4066): Routers, switches, and IP addresses. Networking Operating System support
 - q. Regiment B (PFC, 4066): Trouble calls, support the help desk.
 - r. Regiment A (Captain, 0602): Streamline and lubricate internal and external command and control for all staff sections beginning with the commander. Additionally, help to define the priority and emphasis regarding the means, quality, and frequency of communications.
 - s. Regiment A (SSgt, 2549): Keep the ball rolling and support the Captain.
 - t. Regiment A (Cpl, 4066): Make sure everything runs correctly. Keep the network running.
 - u. Regiment A (Cpl, 2542): Be the best Marine I can be by constantly trying to improve myself through training. By improving myself, I can be successful and dependable.
 - v. Regiment A (LCpl, 4066): The current ISC chief leaves in December so I am working to learn his job, as I will be the ISC chief.
 - w. Regiment A (LCpl, 4066): Troubleshoot ADPE problems and fix them as soon as possible.
 - x. Regiment A (PFC, 4066): Make a good life, gain as much knowledge as possible, and explore the opportunities available.
6. **What are the three most significant events that have impacted your job over the past six months?**
 - a. Regiment C (Major, 0602): Prepare for the ACF, Command generated preventive maintenance confirmation check on all MRC vehicles.
 - b. Regiment C (MgySgt, 2591): took a while to identify any significant events.
 - c. Regiment C (CPL, 4066): Migration training for Windows NT and connectivity for the network.
 - d. Regiment C (CPL, 2542): The last ISC Chief (retention issue) who was the most knowledgeable person at the regiment. Lost Cpl. Matheny due to an automobile accident. Using Windows NT and Windows 95 simultaneously. And the crisis we had in dealing with the Melisa Virus.
 - e. Regiment C (CPL, 2818): Getting promoted, having a junior 2818 join the unit.
 - f. Regiment C (LCPL, 4068): Pending NT migration, Inflow of ADPE, and Training on NT and NT applications.
 - g. Regiment B (Major, 0602): Projects (network infrastructure, FDDI Ring on the base, CSU/DSU dialup connections, etc.). SIPRNET to CMS
 - h. Regiment B (Captain, 0602): Training, fiscal, personnel.

- i. Regiment B (SSgt, 4066): Conversion to NT
 - j. Regiment B (Sgt, 2542): NT migration, fiber backbone, deteriorating manpower issues, training courses.
 - k. Regiment B (Sgt, 2542): Y2K, increase of knowledge required to support hardware and software, budget reductions, no money for training.
 - l. Regiment B (Sgt, 4066): Flattening of the network, intro of the FDDI ring, NOS and IP address issues, NT migration
 - m. Regiment B (LCpl, 2542): NT migration, Melisa virus
 - n. Regiment B (LCpl, 4066): No comments
 - o. Regiment B (LCpl, 4066): Deployment to the field.
 - p. Regiment B (LCpl, 4066): Moving to a battalion next month, just got back from base, taking night courses.
 - q. Regiment B (PFC, 4066): Being here every day doing my job.
 - r. Regiment A (Captain, 0602): Garrison and operationally: conversion to NT, area flattening with the ATM switch, addition of servers that are Y2K compliant, three Banyan Vines software upgrades, Y2K issues and attitudes, and turnover of personnel.
 - s. Regiment A (SSgt, 2549): Y2K, bringing computers on line for all 3 battalions, fiber installation for our camp.
 - t. Regiment A (Cpl, 4066): Faulty equipment, over tasked and under manned, pulled to do other tasks beyond supporting ADPE.
 - u. Regiment A (Cpl, 2542): Field training, UNIX training. Previously, I was the only one who knew how to run the message center. Now that we have conducted cross training, I am allowed to go to the field and learn more about tactical operations.
 - v. Regiment A (LCpl, 4066): Training for Kernal Blitz, loss of Sgt Lee and LCpl Hobert in June, and the training of new people.
 - w. Regiment A (LCpl, 4066): Kernal Blitz, field operations preparing for KB, crypto, routers, server crashes, and the training course.
 - x. Regiment A (PFC, 4066): Boot camp, school, checking into the unit.
7. **Do you have a written mission statement for the data communications section (at what levels does it exist)?**
- a. Regiment C (Major, 0602): I have not given them one, although they have a mission. I interpret their mission as the responsibility to provide data networking required by the regimental staff.
 - b. Regiment C (MgySgt, 2591): Yes.
 - c. Regiment C (CPL, 4066): Yes, for the ISC, LAN Administrator and TASO, however, not for trouble calls.
 - d. Regiment C (CPL, 2542): I think we have one but I'm not sure.
 - e. Regiment C (CPL, 2818): I don't know.
 - f. Regiment C (LCPL, 4068): I think there are, but I'm not sure.

- g. Regiment B (Major, 0602): No
- h. Regiment B (Captain, 0602): Yes, but not in their turnover.
- i. Regiment B (SSgt, 4066): No
- j. Regiment B (Sgt, 2542): Yes, but not for my function
- k. Regiment B (Sgt, 2542): Yes, but not for my function
- l. Regiment B (Sgt, 4066): No
- m. Regiment B (LCpl, 2542): No
- n. Regiment B (LCpl, 4066): No. Everyone is involved in all the functions of supporting the ISMO.
- o. Regiment B (LCpl, 4066): Yes, but not for my function
- p. Regiment B (LCpl, 4066): Not sure, not for my function.
- q. Regiment B (PFC, 4066): No
- r. Regiment A (Captain, 0602): No
- s. Regiment A (SSgt, 2549): Yes
- t. Regiment A (Cpl, 4066): Yes
- u. Regiment A (Cpl, 2542): Not sure
- v. Regiment A (LCpl, 4066): Not sure
- w. Regiment A (LCpl, 4066): I haven't seen it
- x. Regiment A (PFC, 4066): Don't know

8. What level of supervision is provided by the S-6 (and every level below) wrt data communications (This question will be asked at all levels starting with the S-6 down to the lowest ranking Marine.)?

- a. Regiment C (Major, 0602): I assign them tasks and then follow up as time permits. I don't want to over-supervise them. I only spend about 30 minutes a day with the data communications section unless a special event requires additional time.
- b. Regiment C (MgySgt, 2591): Issues relating to the administration actions of the platoon are delegated to the Plt Sgt. Issues relating to ADPE are handled by myself (Comm Chief) for example: when the ISC section is taking too long to respond to trouble calls. On occasion, I will assist the ISC section in conducting the required repairs (only 10% of the time).
- c. Regiment C (CPL, 4066): The S-6 is very involved, probably more so than with any other section (i.e. radio, wire, maintenance, or CMS). He assigns us the task and leaves it up to the NCO in charge to accomplish it. The Comm Chief works the same way, however, he is involved with the ISC section on a daily basis vise weekly for the S-6.
- d. Regiment C (CPL, 2542): The S-6 provides direction on the tasks and is available to assist when required. The Comm Chief checks on us throughout the day but does not get involved unless we need help. The Platoon Sgt is always pulling Marines that I need to get the job done (probably 25% of an ISC Marines day is taken away by the Plt Sgt).

- e. Regiment C (CPL, 2818): I don't know.
- f. Regiment C (LCPL, 4068): The S-6 provides direction to the ISC section once or twice a week unless something important comes up.
- g. Regiment B (Major, 0602): Slight, provides direction.
- h. Regiment B (Captain, 0602): Daily tasking, reporting problems from key staff, SIPRNET problems. Rarely if ever comes to the ISMO shop.
- i. Regiment B (SSgt, 4066): Very little. May provide guidance on occasion, not too often.
- j. Regiment B (Sgt, 2542): Not much, may spend more time overseeing the ISMO, however, not sure.
- k. Regiment B (Sgt, 2542): Identifies taskers and provides direction. Somewhat demanding, however, much less than the ISMO.
- l. Regiment B (Sgt, 4066): Rarely involved. He tasks us through the ISMO
- m. Regiment B (LCpl, 2542): Not sure
- n. Regiment B (LCpl, 4066): In the field he is very active. In garrison, not much involvement at all.
- o. Regiment B (LCpl, 4066): Quite frequently, however the supervision of the IMSO is not very tight. He trusts the ISMO to get the job done.
- p. Regiment B (LCpl, 4066): He is more administrative than anything is.
- q. Regiment B (PFC, 4066): He oversees what is going on. Does not have any real involvement on a daily basis.
- r. Regiment A (Captain, 0602): As needed. I will often flex from detailed supervision to providing my intent and simply following through on the work performed. I have good people capable of getting the job done. I probably spend 40% of my time working ADPE issues. With no S-6A, I have to rely on my people.
- s. Regiment A (SSgt, 2549): Not often. He provides us with a list of tasks (called our pending folder) which we take for action.
- t. Regiment A (Cpl, 4066): A great deal. He hands tasks to be completed to the SSgt, which are subsequently passed on to us. These tasks are provided via daily meetings. If we have a problem, we go directly to the S-6.
- u. Regiment A (Cpl, 2542): Constant! He is confident that we will accomplish the tasks. We keep him informed of our status on a daily basis. He is always there supporting us in the job.
- v. Regiment A (LCpl, 4066): Daily tasking. The SSgt follows through and tells us what to do.
- w. Regiment A (LCpl, 4066): Limited. He will give us an idea of what needs to be done and we will try to implement. The ISC Chief will talk to us and ask our insights, then brief the plan to the S-6.
- x. Regiment A (PFC, 4066): I don't really know.

9. What is the most difficult part of your job?

- a. Regiment C (Major, 0602): Dealing with the staff meetings, planning, etc (typical staff work). Since I do not have an assistant to perform the commodity manager and Platoon commander functions in addition to my staff responsibilities, I find myself spread rather thin.
- b. Regiment C (MgySgt, 2591): I don't think my job is hard. Trying to obtain the information necessary from the S-3 (operations) to establish our communications plan.
- c. Regiment C (CPL, 4066): The expectations of certain end users and their satisfaction/appreciation for services provided (i.e. 3270 access becoming disabled due to the users fault then expecting the ISC section to drop everything in order to resolve the problem (instant gratification)).
- d. Regiment C (CPL, 2542): Not always knowing what to do to fix the user's problem. I am expected to know everything necessary to fix every user's computer problem.
- e. Regiment C (CPL, 2818): My job is not that difficult.
- f. Regiment C (LCPL, 4068): Trying to accomplish the mission without the proper training and equipment.
- g. Regiment B (Major, 0602): Information systems management
- h. Regiment B (Captain, 0602): Getting money for infrastructure hardware
- i. Regiment B (SSgt, 4066): Dealing with the user's complaints. Their expectations of the ISMO section are too high. They don't understand our workload.
- j. Regiment B (Sgt, 2542): Setting priorities with the limitations of manpower.
- k. Regiment B (Sgt, 2542): Answering user's requests for equipment, support, trouble calls, and their expectations of our capabilities.
- l. Regiment B (Sgt, 4066): Expectations of the users to perform the tasks for which we are under trained and under funded. We work with what we have to keep things going.
- m. Regiment B (LCpl, 2542): Dealing with users. They are not very well educated with regard to the computers they use, i.e. accessing the network, using software applications and simple tasks associated with the operating systems.
- n. Regiment B (LCpl, 4066): Taking all available training and providing the support required. I don't get the training needed to do my job so I have to make do with the training I receive.
- o. Regiment B (LCpl, 4066): As a LCpl, there isn't much opportunity to go to school and get the training needed.
- p. Regiment B (LCpl, 4066): So much to learn and understand. I am going to a battalion next month and I know my skills with deteriorate regarding routers and network administration.
- q. Regiment B (PFC, 4066): Work never stops.
- r. Regiment A (Captain, 0602): Balance pop up targets at bay in order to focus on planning.

- s. Regiment A (SSgt, 2549): Keeping everyone happy, specifically with regard to networking issues.
- t. Regiment A (Cpl, 4066): Time management! Integration of new equipment without the proper training.
- u. Regiment A (Cpl, 2542): Trying to learn the skills necessary to support ADPE and performing the task of a 4066.
- v. Regiment A (LCpl, 4066): Most difficult is also the most exiting part: the changes in technology requiring us to constantly learn new topics.
- w. Regiment A (LCpl, 4066): Keeping up with technology (i.e. The NT migration).
- x. Regiment A (PFC, 4066): Keep up with the improvements and products wrt ADPE.

10. How much training do you need to do your job?

- a. Regiment C (Major, 0602): A lot! Constant influx of equipment requires that a Communications Officer stay abreast of their purposes, capabilities and functions within the command and control architecture. Examples include sincgar radio frequency hopping, the migration from Banyan vines to Windows NT and the training associated with encryption devices.
- b. Regiment C (MgySgt, 2591): Communications Chief school provides an introduction to the basic skills necessary to understand this job, however, it is important to take it upon yourself to broaden that understanding within your area of responsibility as a Comm Chief.
- c. Regiment C (CPL, 4066): The Banyan Vines training received was adequate, however, we need to focus more on Windows NT.
- d. Regiment C (CPL, 2542): A lot!
- e. Regiment C (CPL, 2818): Most computer equipment is still covered by the factor warranty. If it is not covered by a warranty, then I send it to ELMACO for repairs. I am very weak at performing any repairs to the computer equipment.
- f. Regiment C (LCPL, 4068): A lot! We have too many responsibilities ranging from the tasks of supporting the garrison and tactical architectures. Maybe we should split up the support so that certain Marines in garrison provide the support required while others focus on supporting tactical requirements.
- g. Regiment B (Major, 0602): The Command and Control Systems Course is fine, however we need much more emphasis on Information technology management and integration issues.
- h. Regiment B (Captain, 0602): Knowledge of a Microsoft Certified Systems Engineer (MCSE) is required. Preferably with experience. Need to be able to utilize software for rapid deployment.
- i. Regiment B (SSgt, 4066): A lot
- j. Regiment B (Sgt, 2542): A lot
- k. Regiment B (Sgt, 2542): At least 2-3 months
- l. Regiment B (Sgt, 4066): A lot, we are constantly training.

- m. Regiment B (LCpl, 2542): A lot
- n. Regiment B (LCpl, 4066): Years
- o. Regiment B (LCpl, 4066): A lot
- p. Regiment B (LCpl, 4066): A lot. Routers for at least six months.
- q. Regiment B (PFC, 4066): I learned enough to be dangerous at school. Everything I know now was learned while on the job.
- r. Regiment A (Captain, 0602): A lot
- s. Regiment A (SSgt, 2549): A lot
- t. Regiment A (Cpl, 4066): A great deal.
- u. Regiment A (Cpl, 2542): A lot
- v. Regiment A (LCpl, 4066): A lot
- w. Regiment A (LCpl, 4066): A lot
- x. Regiment A (PFC, 4066): A lot

11. What kind of training do you need to do your job (for each specific system currently assigned to the regiment)?

- a. Regiment C (Major, 0602): Networking (data)
- b. Regiment C (MgySgt, 2591): Depends on your background, however, I suspect most Comm Chiefs need more training wrt data communications. Specifically, network topology, how it works, different communications paths available, and the equipment used to support it. We don't need to know the details about user accounts, profiles and LAN administration, however, we need to understand the aspects of planning wrt data communications.
- c. Regiment C (CPL, 4066): NT, TCO, IAS, IOW, 3270, MDS, database maintenance and TCP/IP. I have received most (90%) of the training required to perform this job via OJT.
- d. Regiment C (CPL, 2542): Windows NT, MSDOS. Although I do not know what the systems are or who uses them, I know we need training on TCO, IAS, IOW, and TDN.
- e. Regiment C (CPL, 2818): I need a refresher course on hardware, component basics and software.
- f. Regiment C (LCPL, 4068): NT, TCO, IAS, IOW, and TDN. I am not familiar with all the systems, however, I know the acronyms.
- g. Regiment B (Major, 0602): IT related not systems. Maybe NT, however, if the S-6 Officer does not get the same type of training as the new 0602's, then the new Lieutenants will be the ones tasked with performing all the system administration. That is a very dangerous idea. Need to be a leader of Marines first.
- h. Regiment B (Captain, 0602): MCSE skills. At least a six week course focusing on the core package to include TCP/IP, NT Server, NT in the enterprise, network management, LAN admin, etc. Need to teach us how to operate a network in the deployed environment and the issues associated with deploying networks in a main command post and a forward command post.

- i. Regiment B (SSgt, 4066): Need at least a few years of training to include LAN admin, routers, networks, managing Marines, time management, MIMMS, TCO, and TDN.
- j. Regiment B (Sgt, 2542): Networking, NT Banyan, NT Admin, exchange, servers. I don't even know what TCO, IAS, IOW, and TDN are.
- k. Regiment B (Sgt, 2542): MIMMS, CMR accountability, warranty work, record jackets, ID of ADPE. I don't even know what TCO, IAS, IOW, and TDN are.
- l. Regiment B (Sgt, 4066): Routers, TCP/IP, subnetting, supernetting, basics of server troubleshooting, MS DOS, peripheral support, basic knowledge of the Internet.
- m. Regiment B (LCpl, 2542): NT admin, Banyan vines admin, NT server, integration of NT and Windows 95, Microsoft Outlook.
- n. Regiment B (LCpl, 4066): MCSE, Cisco routers, basic networking, software applications and at least 10 other things relating to IT support.
- o. Regiment B (LCpl, 4066): In-depth NT MCSE courses. I don't even know TCO, IAS, IOW or TDN.
- p. Regiment B (LCpl, 4066): Routers for 6 months, Cabletron, training to identify the needs of the users, software applications, software interfaces, i.e. 3270. Training needs to be focused on the functional area with coordination between us the users.
- q. Regiment B (PFC, 4066): Training needs to be realistic. In school we learned on new PCs in a perfect environment. Out here we are faced with old computers that are not alike and we don't have the tools available to us that we learned about in school.
- r. Regiment A (Captain, 0602): Staff planning, task management, MEU SOC rotation, supply, MIMMS, single channel radio, training techniques, engaged with the staff and their concerns. Must think as a MAGTF officer not as an S-6.
- s. Regiment A (SSgt, 2549): People skills, computer knowledge, NT, networking, routers, leadership, and time management.
- t. Regiment A (Cpl, 4066): Router, servers, NT, tactical training, TCO, IAS, IOW. Cross training with the FCC-100, MRC-142 and the crypto used in the field.
- u. Regiment A (Cpl, 2542): Trouble shooting PCs, servers, applications, peripherals. Although I'm not sure what they do, we also need to know TCO, IAS, and IOW. We also need TCP/IP, routers, and network switching knowledge.
- v. Regiment A (LCpl, 4066): Networks, work stations, processes for record keeping, message center operations, CMR, open purchases, serve mart, record jackets, peripherals, field networking, NT, Banyan vines, switches, TCP/IP, TCO, IAS, and IOW.
- w. Regiment A (LCpl, 4066): School provided us a broad overview with the basic concepts. We need more trouble shooting, PC networking, and Windows NT.
- x. Regiment A (PFC, 4066): More in-depth training on NT, Banyan Vines, Crypto, and cabling.

12. Do you think Marines at the regimental level receive the proper training wrt IT?

If not, what should be done about it?

- a. Regiment C (Major, 0602): The training received by the 4066's out of school is not properly targeted. Training needs to be more oriented towards Windows NT. Currently, the division spends up to 90 days conducting focused training for all Marines prior to their assignment to the regiment.
- b. Regiment C (MgySgt, 2591): Tactical data communications (need more!). Majority of the training received is geared towards the garrison environment. I believe the individual units should seek the training. The training should be coordinated (provided) by division.
- c. Regiment C (CPL, 4066): No! Division should take the time to provide classes regarding the skills required for all ISCs. These classes should include Windows NT, TCO, IAS, IOW, TCP/IP and 3270. If the division cannot provide the classes necessary, then allow Marines to attend the courses at Coastal Carolina Community College. The problem with the community college for those of us in the regiment is we cannot sign up for them as we are on the ACF or our deployment schedule does not afford us the opportunity.
- d. Regiment C (CPL, 2542): One or two Marines from each shop receive the training provided by division, however, they don't understand IT well enough to provide the support required when they arrive at the regiment.
- e. Regiment C (CPL, 2818): I'm not sure.
- f. Regiment C (LCPL, 4068): No! Division G-6 should train 4066's as they currently do plus provide additional training on routers, NT, TCO, IAS, etc.
- g. Regiment B (Major, 0602): No! Should not have to use FMF O&M funds. Vender training, mobile training, etc. We are moving to a new immature system with NT. Marines need more detailed training. MCESS is broken! The answer now is mobile training teams and vendor training.
- h. Regiment B (Captain, 0602): No! Need to make the original enlistment a six-year commitment. Give the basic network, network management, LAN admin training over a 6-7 month period. Need to teach the Marines how to operate a network as well as deploy it.
- i. Regiment B (SSgt, 4066): No! 40XX needs to be bumped up to a six-year obligation with more training provided.
- j. Regiment B (Sgt, 2542): No! Improve the basic school. Send Marines to advance courses earlier. I like the 4068 idea.
- k. Regiment B (Sgt, 2542): No! They pick it up in time via OJT, however, some of them don't have the aptitude. Provide greater details in the initial training. Make the MOS a six-year commitment. The learning required to provide the level of support expected is college level.
- l. Regiment B (Sgt, 4066): No! We need to train the Marines with the skills necessary, however, the Marine Corps won't because they can not retain the

Marines once they receive the necessary training. We need more of the basics. We can learn some of the advanced material via OJT, however, that requires a skilled individual within the command.

- m. Regiment B (LCpl, 2542): No! Basics, teach 40XX like computer technicians are trained. Give them the basics them move on too more advanced subjects. Lengthen the courses by a couple months (only 7 weeks now).
- n. Regiment B (LCpl, 4066): No! Need the right equipment plus more people. Divide the 40XX MOS into three levels of training. Focus on hardware, software, and networking. Basic and advanced courses should be a minimum of six months.
- o. Regiment B (LCpl, 4066): No! Mobile training teams are needed to teach the courses offered by MCESS.
- p. Regiment B (LCpl, 4066): No! More advanced training for new Marines. Seems like the Marine Corps is afraid of training us because we will get out at the end of our current contract. As a result, we are forced to learn what we can OJT. Without trained personnel in the unit, we can not learn the harder topics.
- q. Regiment B (PFC, 4066): No! Should learn more before we arrive at the unit. Increase the length of the school, increase the length of the contract and provide realistic training.
- r. Regiment A (Captain, 0602): No! Retention, need more data types. Takes at least a year to make them proficient. Marines are working 60 hours a week (day on stay on) with little or no relief in sight. Free up the procurement for training via local contract support or other means. Use Mobile training teams to accommodate the problems associated with OP TEMPO. Current training system does not support our schedule as we are precluded from taking advantage of the training that is offered.
- s. Regiment A (SSgt, 2549): No! Marines are learning one thing at the school yet need to learn something different from us. The school is not focused on training the proper information to new Marines. (I.e. the material taught at the schools for NT is not sufficient as the Marines have to be retaught the material when they arrive.)
- t. Regiment A (Cpl, 4066): No! Information learned in school does not prepare you at all for the regiment. I.e. The information is taught in a lab environment for trouble shooting yet the solutions necessary in the real world are quite different.
- u. Regiment A (Cpl, 2542): No! The school should address the issues of system administration, server admin, switches, routers, etc. Extend the school duration to teach the skills necessary. Data is a very important role in supporting all the functions within the Marine Corps. OJT is better and more valuable than the training received at the schools.
- v. Regiment A (LCpl, 4066): No! We learn the concepts yet don't know how to apply them. Need OJT in order to understand our job, however, we can't receive

the OJT necessary if we don't have leadership with the proper training. Need MTT and a modified structure.

- w. Regiment A (LCpl, 4066): No! The school leaves us very unprepared with only a basic foundation. Increase the length of school to include contract length if necessary. SOPs for each command that address training, processes, and the evolution of Marines.
- x. Regiment A (PFC, 4066): No! We were rushed through the school in eight weeks. Make the duration at the school longer and extend the contract requirement if necessary.

13. Who do you depend on to perform your job?

- a. Regiment C (Major, 0602): All my SNCOs. All functional leaders. I don't have enough time do all my staff functions as well as my other responsibilities, therefor, I must depend on my SNCOs to do there job well.
- b. Regiment C (MgySgt, 2591): My Marines.
- c. Regiment C (CPL, 4066): The 2542's who perform the trouble calls and the Communications Chief.
- d. Regiment C (CPL, 2542): The best training would be to have someone who is experienced (SNCO) work in the regimental shop with the ISC section. I feel like I don't have anyone to help me except division. The ISC's at division are always very busy and can't always help when needed.
- e. Regiment C (CPL, 2818): The ISC section.
- f. Regiment C (LCPL, 4068): Nobody. I am the one who responds to trouble calls and open trouble tickets.
- g. Regiment B (Major, 0602): Communications Chief and the ISMO
- h. Regiment B (Captain, 0602): ISMO Chief, ISC Chief, and Equipment Chief
- i. Regiment B (SSgt, 4066): The Sgts
- j. Regiment B (Sgt, 2542): My Marines
- k. Regiment B (Sgt, 2542): My Marines
- l. Regiment B (Sgt, 4066): Nobody. The equipment to perform the task
- m. Regiment B (LCpl, 2542): Nobody
- n. Regiment B (LCpl, 4066): Me
- o. Regiment B (LCpl, 4066): Nobody
- p. Regiment B (LCpl, 4066): Myself. We all work together to get the job done.
- q. Regiment B (PFC, 4066): My NCOs
- r. Regiment A (Captain, 0602): Comm Chief, Radio Chief, Wire Chief, and Cpl. Gibson.
- s. Regiment A (SSgt, 2549): My Marines. I give direction and allow them to accomplish the mission
- t. Regiment A (Cpl, 4066): All my Marines.
- u. Regiment A (Cpl, 2542): Each other.
- v. Regiment A (LCpl, 4066): Cpl. Gibson

- w. Regiment A (LCpl, 4066): Cpl. Gibson
- x. Regiment A (PFC, 4066): All the ADPE personnel

14. Is there one person in your unit that most IT support people depend on?

- a. Regiment C (Major, 0602): My Communications Chief and possibly myself.
- b. Regiment C (MgySgt, 2591): One month ago (end of March, 1999) it was Sgt Skare (2542). Shortly after Sgt Skare (2542) left the unit, Cpl. Matheny (4066) was the one we depended however, and he was struck by an automobile and is now on convalescent leave (1 April). Now we depend on LCpl Fritch.
- c. Regiment C (CPL, 4066): They depend on me!
- d. Regiment C (CPL, 2542): Both Marines were already taken from us due to injury or through discharge. Now the person everyone depends on is myself. If not me, then someone at division.
- e. Regiment C (CPL, 2818): It was Sgt Skary (2542), then Cpl. Matheny (4066) and now Cpl. Sullivan.
- f. Regiment C (LCPL, 4068): It was Sgt Skary (2542), then Cpl. Matheny (4066) and now its me.
- g. Regiment B (Major, 0602): ISMO (0602)
- h. Regiment B (Captain, 0602): Sgt Stedmond (2542) left yesterday, now Sgt Campbell (2542)
- i. Regiment B (SSgt, 4066): Sgt Campbell (2542)
- j. Regiment B (Sgt, 2542): Sgt Campbell (2542) and the ISMO (0602)
- k. Regiment B (Sgt, 2542): The ISMO (0602) and Sgt Campbell (2542)
- l. Regiment B (Sgt, 4066): The ISMO (0602)
- m. Regiment B (LCpl, 2542): The ISMO (0602) and Sgt Campbell (2542)
- n. Regiment B (LCpl, 4066): Everyone plays a key part in the shop but, if we lost the ISMO (0602) and Sgt Campbell (2542), it would be hard going.
- o. Regiment B (LCpl, 4066): The ISMO (0602) and Sgt Campbell (2542)
- p. Regiment B (LCpl, 4066): Sgt Campbell (2542) and Sgt Gross (4066)
- q. Regiment B (PFC, 4066): Sgt Powell (2542)
- r. Regiment A (Captain, 0602): Cpl. Gibson (4066)
- s. Regiment A (SSgt, 2549): Cpl. Gibson (4066)
- t. Regiment A (Cpl, 4066): Loosing any one person would be very difficult to deal with, as our task load is extremely high.
- u. Regiment A (Cpl, 2542): Cpl. Gibson (4066)
- v. Regiment A (LCpl, 4066): Cpl. Gibson (4066)
- w. Regiment A (LCpl, 4066): Cpl. Gibson (4066)
- x. Regiment A (PFC, 4066): Cpl. Gibson (4066)

15. What do you think your opportunities are with regards to your future in the Marine Corps? The civilian sector?

- a. Regiment C (Major, 0602): Great opportunities as I can always learn something new to improve my knowledge of command and control. Great marketability wrt the civilian sector (ever increasing).
- b. Regiment C (MgySgt, 2591): I have attended all the schools the Marine Corps will provide. My job now is to provide leadership to other Marines in the Communications field. My future in the civilian sector is entirely up to me. I am currently pursuing a BS in ITM.
- c. Regiment C (CPL, 4066): Good, however they are much better in the civilian sector.
- d. Regiment C (CPL, 2542): The civilian sector looks 100% better than the Marine Corps. The civilian sector is much more serious about training, providing technical support and the money required to accomplish the mission. The civilian section is more professional with you and don't have all the distractions associated with the duties of being a Marine.
- e. Regiment C (CPL, 2818): Good. I know I need more training before I can move into the 2821 MOS and become a Sgt. Once I reach that goal I will have the skills necessary to get a good job in the civilian sector.
- f. Regiment C (LCPL, 4068): I knew my career in the Marine Corps was over after I received a Court-Martial. However, my future in the civilian sector is limitless.
- g. Regiment B (Major, 0602): Good. Civilian sector is good as well.
- h. Regiment B (Captain, 0602): I have 15 years in now. I would like to stay involved in networking, however, I realize I can be assigned to several different types of jobs outside data communications. Civilian sector looks great.
- i. Regiment B (SSgt, 4066): Great. Civilian sector is even better.
- j. Regiment B (Sgt, 2542): Good. Civilian sector looks much better than the Marine Corps.
- k. Wide open, I can do what ever I want to do. Civilian sector looks good, however, I would have less security if I got out.
- l. Regiment B (Sgt, 4066): I don't see much of a future in the Marine Corps. We are under-appreciated and over worked. The civilian sector looks great with a wealth of opportunities. This field is always changing which provides a great demand for those with the skills required.
- m. Regiment B (LCpl, 2542): I am very short (EAS 15 Aug 99) and looking forward to working in the civilian sector.
- n. Regiment B (LCpl, 4066): None in the Marine Corps, however, the civilian sector looks great!
- o. Regiment B (LCpl, 4066): In the next 2 ½ years I don't think there will be many opportunities for me although as a Marine, the opportunities have been great. I think the civilian sector offers more.

- p. Regiment B (LCpl, 4066): There are opportunities down the road, however, they require me to get promoted. I am concerned about the leadership within our shop and what happens when he leaves. The civilian sector is great.
- q. Regiment B (PFC, 4066): Very good. I want to go to school. I grew up in the Marine Corps and want to stay in. I know I can make a lot of money in the civilian sector, however, right now, I want to stay in.
- r. Regiment A (Captain, 0602): Great! Although we are called unrestricted line officers, I think we are very limited in the types of jobs we can be assigned. Specifically, Communications Officers get beat up quite a bit while serving in the GCE billets (Comm Sucks but training was good). Communications Officers need to understand what all the other sections do and how they do it (i.e. We must be the MAGTF Officer). Civilian sector is better, unrestricted.
- s. Regiment A (SSgt, 2549): Good! With my background, I should be selected for promotion. My MOS is combining with the 4066 MOS. Civilian: even better.
- t. Regiment A (Cpl, 4066): Grim! I am assigned to the med. board and will be getting out in December. Civilian: great!
- u. Regiment A (Cpl, 2542): Limited as a 2542. If I can latmove, then much better. Civilian is real good.
- v. Regiment A (LCpl, 4066): OK! I want more training and trying to get it through night school. Civilian is much better.
- w. Regiment A (LCpl, 4066): I have the best job you can get in the Marine Corps; however, it is difficult to keep us in. Training is OK, however, the training we receive at the regiment is very limited. Civilian: the possibilities are endless.
- x. Regiment A (PFC, 4066): Great! More education, degree programs, and possibly a commission. Civilian: I will be very well prepared at the end of my enlistment.

16. Do you currently plan on re-enlisting in the Marine Corps at the end or your contract?

- a. Regiment C (Major, 0602): If I am not allowed the opportunities to improve my knowledge base then I may decide to resign and find a new job. The opportunities I am referring to include NPS or Command and Staff education.
- b. Regiment C (MgySgt, 2591): I re-enlist in the Marine Corps on 12 April, 99.
- c. Regiment C (CPL, 4066): No! I will get out of the Marine Corps on July 18th. I wanted to work at a higher level than the regiment (i.e. division or MEF headquarters).
- d. Regiment C (CPL, 2542): No! I am getting out Feb, 2000.
- e. Regiment C (CPL, 2818): Yes! My EAS is July 2000.
- f. Regiment C (LCPL, 4068): No! My EAS is Jan 19, 2000 plus 63 bad days.
- g. Regiment B (Major, 0602): 15 years in now, I will stay until 20.
- h. Regiment B (Captain, 0602): Yes.

- i. Regiment B (SSgt, 4066): 13 years in now and I will re-enlist. My EAS is Oct 2000. One complaint I have is the miss management of 40XX. We are short 40XX in the Marine Corps yet we continue to send them on a "B" billet.
- j. Regiment B (Sgt, 2542): 6 ½ years in now, however, if I can't LAT MOVE to the 4066 MOS then No! I won't re-enlist. EAS Jan 2001.
- k. Regiment B (Sgt, 2542): Yes! EAS 2003, just re-enlisted 21 Apr 99.
- l. Regiment B (Sgt, 4066): No! EAS June 99, I will not re-enlist.
- m. Regiment B (LCpl, 2542): No! EAS Aug 99, I will not re-enlist.
- n. Regiment B (LCpl, 4066): No! EAS JAN 2002, I will not re-enlist.
- o. Regiment B (LCpl, 4066): No! EAS Aug 2001, I will not re-enlist.
- p. Regiment B (LCpl, 4066): No! EAS Aug 2001, I will not re-enlist.
- q. Regiment B (PFC, 4066): Don't know! EAS Mar 2002.
- r. Regiment A (Captain, 0602): Flipping a coin right now trying to decide if I will accept promotion or get out. The reason why I have stayed in thus far is because of the 20% who always work hard busting their hump to get the job done. We lean too hard on the few Marines who get everything done (the dirty dozen). These are also the Marines that are not sure if they will reenlist because of the amount of work they are tasked with.
- s. Regiment A (SSgt, 2549): Yes, my EAS is Mar 2000; I have 15 years in.
- t. Regiment A (Cpl, 4066): No! EAS is Feb 2000.
- u. Regiment A (Cpl, 2542): Yes! EAS is Nov 2000. I feel the Marine Corps will allow me to LAT move thus I will reenlist. If I can not LAT move then I will get out.
- v. Regiment A (LCpl, 4066): No! EAS is Oct 2001. I want to finish my college education and gain a better understanding of IT.
- w. Regiment A (LCpl, 4066): Currently undecided. EAS is Oct 2001. If I had to decide today it would be no. My intentions when I came into the Marine Corps was to only stay for four years.
- x. Regiment A (PFC, 4066): I don't know, however, if I had to decide today it would be no! My EAS is Aug 2002.

APPENDIX G. ACRONYMS

ACE - Air Combat Element
AFATDS – Advanced Field Artillery Tactical Data System
AN/MRC – Army Navy/Mobile Radio Communications
ASR - Authorized Strength Report
ATM – Asynchronous Transfer Mode
BGSIT – Battle Group/Amphibious Ready Group Systems Integration Testing
C2 - Command and Control
C4I - Command, Control, Communications, Computers and Intelligence
C4ISR - Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
CAT – Category Level for network cabling
CBRS – Concept Based Requirements System
CC – Command Center
CDS - Combat Development System
CE - Command Element
CG – Commanding General
CINC – Commander in Chief
CIO - Chief Information Officer
CMC – Commandant of the Marine Corps
COC – Combat Operations Center
COE - Common Operating Environment
COTS – Commercial Off-the-Shelf
CP – Command Post
CSS – Capability Sustainment System
CSSE - Combat Service Support Element
CTP – Common Tactical Picture
DC/S – Deputy Chief of Staff
DII - Defense Information Infrastructure
DLC – Distance Learning Center
DOD – Department of Defense
DON – Department of Navy
DOTES - Doctrine, Organization, Training and Education, Equipment Support and Facilities
DPG – Department of Navy Planning Guidance
DSS – Decision Support System
EICOC – Expeditionary Integrated Combat Operations Center
ESD – Electrostatic Discharge
EPLRS – Enhanced Position, Location, Reporting System

FAA – Functional Area Analysis
FLC – Functional Learning Center
FONS – Fleet Operational Needs Statement
FSSG – Force Service Support Group
FY – Fiscal Year
GCCS - Global Command and Control System
GCE - Ground Combat Element
HDLC – High-level Data Link Control
HF – High Frequency
HP – Hewlett Packard
HQMC - Head Quarters, U. S. Marine Corps
HRD – Human Resource Development
IAS – Intelligence Analysis System
ICDB – Integrated Curriculum Design Board
IFSAS – Initial Fire Support Automated System
IM – Information Management
IOW – Intelligence Operations Workstation
ISC – Information Systems Coordinator
IT - Information Technology
IT21 – Information Technology for the 21st Century
ITS – Individual Training Standards
ISD – Instructional Systems Development
JMCIS - Joint Maritime Communication Information System
JOTS – Joint Operational Tactical System
JROC – Joint Requirements Oversight Committee
JTF - Joint Task Force
JV2010 - Joint Vision 2010
KBPS – Kilobits Per Second
LAN – Local Area Network
LFSP – Landing Force Support Party
LTI – Limited Technical Inspection
MAGTF - Marine Air Ground Task Force
MAN – Metropolitan Area Network
MARCORMATCOM – United States Marine Corps Material Command
MARCORSYSCOM – United States Marine Corps Systems Command
MARFORLANT - United States Marine Corps Forces, Atlantic
MARFORPAC - United States Marine Corps Forces, Pacific
MCCDC – Marine Corps Combat Development Command
MCCIP – Marine Corps Continuous Process Improvement Program
MCCLS – Marine Corps Lessons Learned System
MCEN – Marine Corps Enterprise Network
MCHS - Marine Corps Common Hardware Suite

MCMP – Marine Corps Master Plan
MDSS – MAGTF Deployment Support System
MEF – Marine Expeditionary Force
MEU – Marine Expeditionary Unit
MLCM – Material Life Cycle Management
MNS – Mission Need Statement
MOE - Measures of Effectiveness
MOP - Measures of Performance
MOS – Military Occupational Specialty
MSBL - Marine Air Ground Task Force Software Baseline
MWR – Morale, Welfare, and Recreation
NCTS-A – Naval Tactical Command System-Afloat
NIPS – Naval Tactical Command System-Afloat Intelligence Processing Service
NMS – National Military Strategy
NT – New Technology
OCCFLD – Occupational Field
OJT – On-the-Job
ORD - Operational Requirements Documents
OS – Operating System
OSD – Office of the Secretary of Defense
P4 – Personal For
PC – Personal Computer
PD – Product Development
PLRS – Position Location Reporting System
POI – Period of Instruction
POM – Program Objective Memoranda
PP&O - Plans, Policies and Operations
PPBS – Planning, Programming, and Budgeting System
PST – Performance Support Tools
RA – Resource Allocation
SA – Service Advocacy
SAT – Systems Approach to Training
SDS – Solution Development System
SME – Subject Matter Expert
SRIG – Surveillance, Reconnaissance, and Intelligence Group
T&E - Training and Education
TCO – Tactical Combat Operations
TCP/IP – Transfer Control Protocol/Internet Protocol
TDBMS – Track Database Management System
TDN – Tactical Data Network
TDS – Training Development System
TFS - Total Force Structure

TMI – Training Modernization Initiative
TRG – Training Review Group
TS/SCI – Top Secret/Special Compartmented Information
TPP – Tactics, Techniques, and Procedures
T/E – Table of Equipment
T/O – Table of Organization
UD/MIPS – Unit Diary/ Military Information Personnel System
UHF – Ultra High Frequency
ULCS – Unit Level Circuit Switch
UOC – Unit Operations Center
UPS – Un-interupable Power Supply
UTP – Unshielded Twisted Pair
VHF – Very High Frequency
WAN – Wide Area Network
WDID – Warfighting Development Integration Division
Y2K – Year 2000

LIST OF REFERENCES

1. Computer Sciences Corporation DEIS. Tactical Data Network (TDN) Integration and Management Support (TIMS), Production Documentation Manpower and Training Plan for the Tactical Data Network. July 1, 1998.
2. Defense Systems Management College. Systems Engineering Management Guide, 1983.
3. Department of the Navy, Commander Naval Air Force, United States Pacific Fleet. Battle Group/Amphibious Ready Group Combat C4I Systems Integration Testing (SIT), Joint CINC Instruction, 20 April 1995.
4. Goldstein, Irwin L. Training in Organizations: Needs Assessment, Development, and Evaluation (Cypress Series in Work and Science). 3rd ed. Brooks/Cole, September 1992.
5. Lucent Technologies and Boeing. United States Marine Corps Information Technology Infrastructure Assessment and Improvement Planning Task, Phase Three Report (N68939-97-D-0040), 15 July, 1998.
6. Mason and Mitroff. Challenging Strategic Planning Assumptions: Theory, Cases, and Techniques. School of Business Administration, University of Southern California, Los Angeles, California, 1981.
7. United States Marine Corps. Command and Control, Marine Corps Doctrinal Publication 6, October 1996.
8. United States Marine Corps. Components List for INTEL/OPS Workstation (IOW) AN/UYQ-XX, November 1998.
9. United States Marine Corps. Ideas and Issues, FMFM 2-1 (Draft), October 1992.
10. United States Marine Corps. Information Management Plan (Draft), January 1998.
11. United States Marine Corps. Marine Air Ground Task Force Organization, Amphibious Warfare MCI, September 1995.
12. United States Marine Corps. Marine Air Ground Task Force Organization, Command and Staff MCI, September 1992.
13. United States Marine Corps. Marine Corps Combat Development System, Marine Corps Order P3900.15A. (Draft). 1 September 1998.

14. United States Marine Corps. The Role of the Marine Corps in the National Defense, Fleet Marine Force Manual (FMFM) 1-2, June 1991.
15. United States Marine Corps, 3D and 4TH Marine Regiments. Joint Standing Operating Procedures for Combat Operations for Third and Fourth Marine Regiments, 3 December 1997.
16. United States Marine Corps and Systems Research and Applications International. United States Marine Corps Continuous Process Improvement Program: Program Report April 1995 – December 1996. Arlington: Systems Research and Applications International, Inc., 1996.
17. United States Marine Corps and Systems Research and Applications International. United States Marine Corps Continuous Process Improvement Program: USMC Business Enterprise Model. Arlington: Systems Research and Applications International, Inc., 1998.
18. United States Marine Corps, Marine Corps Combat Development Command, Requirements Division. Tactical Data Network Brief. March 1999.
19. United States Marine Corps, Marine Corps Combat Development Command, Training and Education Division. Training Development System Procedures Manual (Draft). March 1999.
20. United States Marine Corps, Marine Corps Systems Command. Intelligence Analysis System (IAS) Desktop Version AN/UYQ-80, User's Logistic Support Summary, November 1998.
21. United States Marine Corps, Marine Corps Systems Command. Minutes of the Intelligence/Operations (Intel/Ops) Laptop Workstation (IOW) Integrated Product Team (IPT) Meeting 21-22 January 1998. Online. Internet. 18 February 1999.
Available: <http://gatornt2.spawar.navy.mil/usmc>.
22. United States Marine Corps, Marine Corps Systems Command. Tactical Combat Operations (TCO) Operator Course Manual, September 1997.
23. United States Marine Corps, Marine Corps Systems Command. Tactical Combat Operations (TCO) System Administration Manual, September 1997.
24. United States Marine Corps, Marine Corps Systems Command. Tactical Combat Operations (TCO) System Desktop Version AN/UYQ-80, User's Logistic Support Summary (Revision 1), March 1998.

25. United States Marine Corps, Marine Corps Systems Command. Transition to the Defense Integrated Infrastructure (DII) Common Operating Environment (COE) Draft, MAGTF C4I Volume I (Technical Assessment) and Volume II (Strategy), November 1997, p. 1.1
26. United States Marine Corps, Marine Corps Systems Command. Transition to the Global Command and Control System (GCCS) Common Operating Environment (COE), MAGTF C4I Executive Summary Parts I and II, March 1994.
27. United States Marine Corps, Marine Corps Systems Command. Transition to the Defense Integrated Infrastructure (DII) Common Operating Environment (COE) Draft, MAGTF C4I Volume I (Technical Assessment) and Volume II (Strategy), November 1997.
28. United States Marine Corps, Marine Corps Systems Command. Unit Operations Center Prototype Drawing. Online. Internet. 11 January 1999. Available: <http://gatornt2.spawar.navy.mil/usmc>.
29. United States Marine Corps, Marine Corps Tactical Systems Support Activity (MCTSSA). MAGTF C4I Software Baseline (MSBL) Migration Strategy, September 1996.

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